

SERIES

The Main Book

By A Group of Supervisors



## THEME ONE: **Systems** UNIT 1 **Living Systems Adaptation and** Survival: - Lesson 1 \_\_\_\_\_\_15 - Lesson 2 (Part A) \_\_\_\_\_\_ 25 - Lesson 2 (Part B) \_\_\_\_\_\_ 38 - Lesson 3 \_\_\_\_\_\_50 - Lesson 5 ..... - Model Exams on concept (1.1) Senses at Work : - Lesson 1 \_\_\_\_\_\_91 - Lesson 2 \_\_\_\_\_\_97 - Lesson 4 - Model Exams on concept (1.2) Light and Sight : - Lesson 1 \_\_\_\_\_\_131

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- Lesson 4

- Model Exams on concept (1.3)

# THEME TWO: Matter and Energy UNIT 2

Motion

Starting and Stopping:

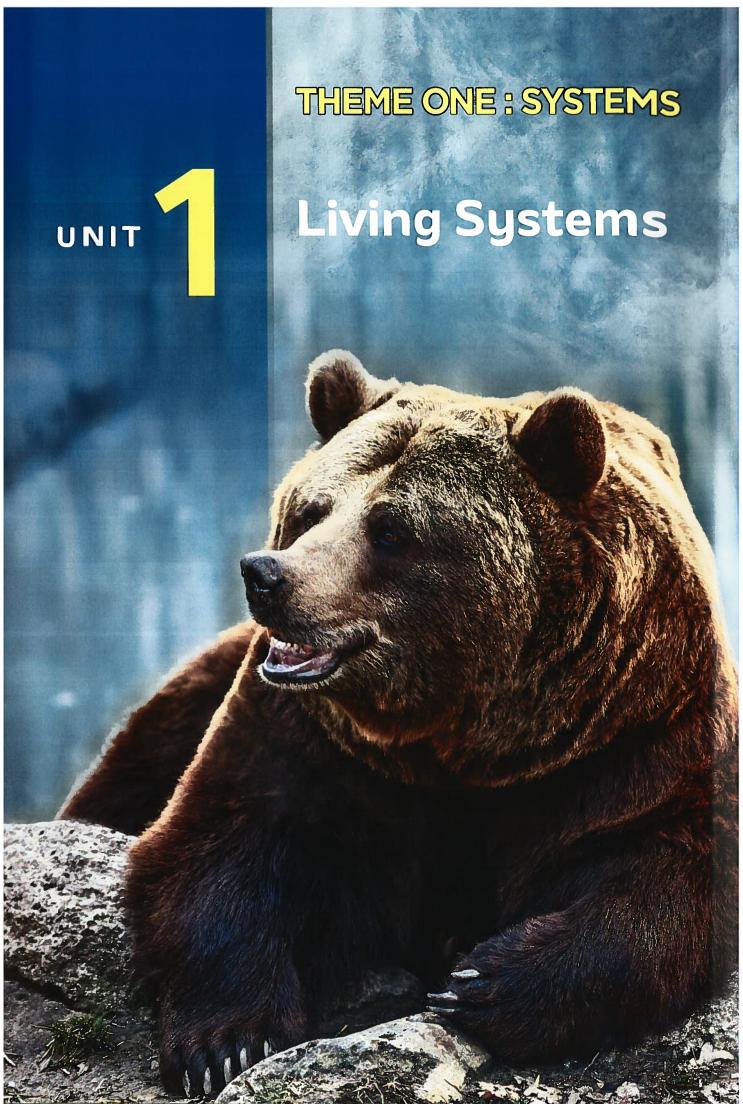
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# Get Started What I Already Know



- There are many factors that affect the life of living organisms in their environments such as :
  - Hot and cold temperature.

- Amount of water.

- Availability of food.

- Availability of shelter.
- Overtime, animals and plants adapt or change according to the previous factors, so that they can live, eat, breathe, stay safe and so on.

#### **Examples:**

 Camel's body is covered with a special hairy skin to protect it from the hot weather in desert.



Camel

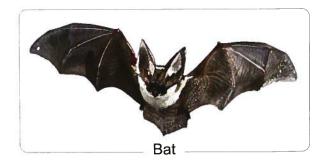
 Palm trees have strong trunk to help them resist the strong winds in desert.

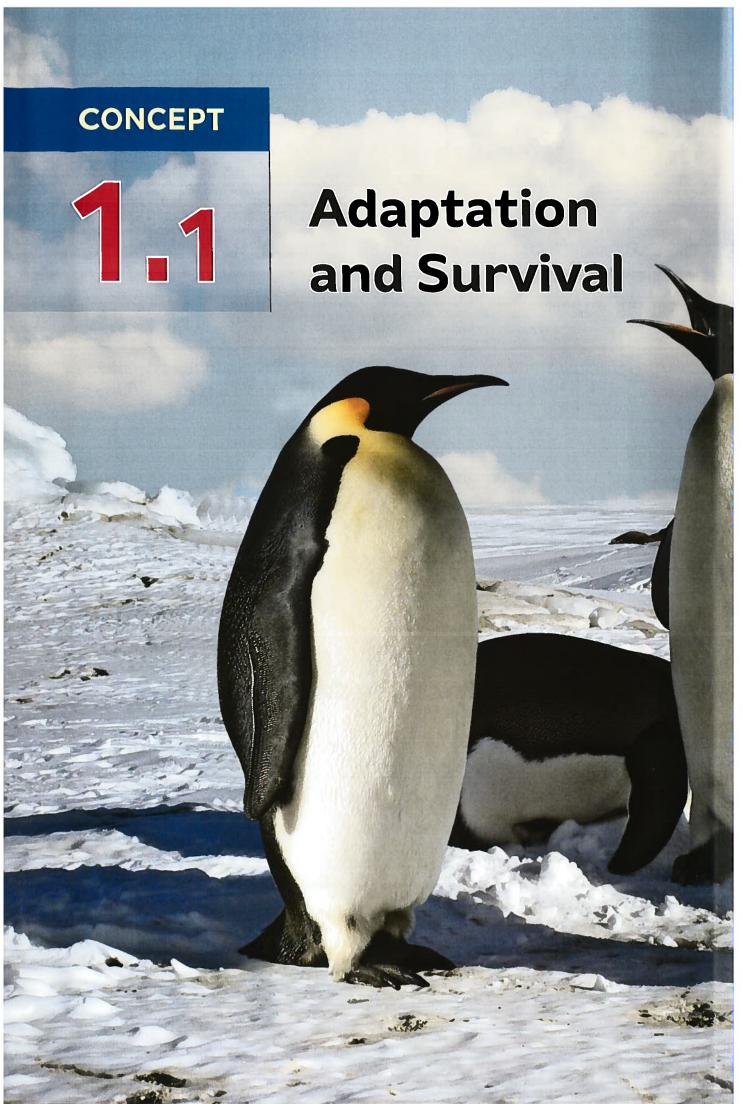


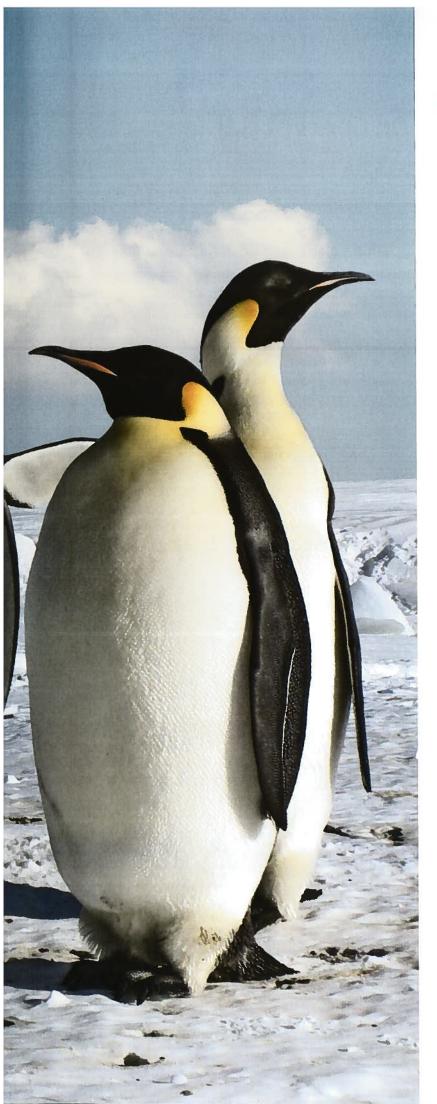
Palm tree

- In this unit, you are going to study :
  - Types of adaptations of living organisms.
  - How humans and animals use their senses to gather (collect) information.
  - Adaptations of some animals that are active at night.
  - How humans and animals communicate and transfer information.
- Unit Project : "Bat Chat"

At the end of this unit, you will make a research project about "Bats" to learn how their adaptations help them to navigate, hunt and communicate.







#### **Learning outcomes**

## By the end of this concept, your child will be able to:

- Model the relationships between an organism's survival, habitat, adaptations and body systems.
- Argue from evidence that plants and animals have structures and behaviors that help them survive and grow.
- Explain how structural adaptations help organisms survive in specific environments.
- Argue from evidence that multiple adaptations or organs work together in systems to help organisms survive in specific habitats.

#### Key vocabulary

- Adaptation
- Camouflage
- Organs
- Digestive system
- Ecosystem
- Energy
- Extinct
- Survive
- Organism
- Pollute
- Predator
- Prev
- Reproduce
- Respiratory system

## Notes For Parents

## On Concept [1.1]

Lessons		Activities	What you should do with your child
		Activity 1	Explain to your child how living organisms can adapt to the environment in which they live.
1		Activity 2	Discuss with your child how penguins can adapt to live in polar regions.
		Activity 3	Explain to your child how different bears, caracal, fennec fox and some desert lizards can adapt to live in their environments through "camouflage".
	Activity 4		Discuss with your child the structural adaptations and behavioral adaptations of fennec fox, arctic fox and bull shark.
2	Part (A)	Activity 5	Discuss with your child the structural adaptations and behavioral adaptations of panther chameleon.
2	(B)	Activity 6	Discuss with your child the structural adaptations and behavioral adaptations of plants such as acacia tree and kapok tree.
	Part (B)	Activity 7	Explain to your child how some plants can adapt to live in their environments such as mangrove tree, water lily, palm treeetc.
2		Activity 8	Discuss with your child how some organs of the human digestive system can adapt to do their functions to help the human body survive.
3		Activity 9	Discuss with your child how some organs of the human respiratory system can adapt to do their functions to help the human body survive.
		Activity 10	Let your child think about the similarities and differences between the respiratory system of humans and fish.
4		Activity 11	Discuss with your child some of the ecosystem changes that are caused by the nature and also the effect of human activities on plants, animals and humans.
		Activity 12	Help your child to think like a scientist by answering a question about one of the main points of this concept then write his/her claim, evidence and the scientific explanation.
5		Activity 13	Let your child determine a problem in the environment and find out the best solution for this problem such as : how to protect some types of frogs from extinction.

## **LESSON ONE**

## **Activity 1 Can You Explain?**



## Do you notice how each of the previous living organisms protect itself from extreme hot climate?

- Starred agama lizard that lives in the desert protects itself by finding shaded area during a hot sunny day to keep its body cool.
- Palm leaves are covered with waxy layer to protect them from extreme hot climate.
- 3 Human being protects himself from extreme hot climate by using umbrella and light clothes.
- ▶ Each of the previous living organisms has different ways to protect itself from extreme hot climate, and these different ways are known as "Adaptations".

#### Adaptations:

They are characteristics that help living organisms to survive and reproduce in the ecosystem in which they live.

- Adaptations occur over many generations.
- ▶ In this concept, we will study:
  - Types of adaptations.
  - Human's body systems and their adaptations.

**Note** 

Ecosystem is an area in which living organisms and nonliving things interact with each other.

Plant adaptations.

agama lizard shade area waxy layer extreme سحلية العجمة hot climate منطقة الظل adaptation

survive شدید reproduce المناخ الحار characteristics

ecosystem یبقی حیّا interact ینکاثر generations

نظام بیئی یتفاعل أجیال

## **Activity 2 Penguin**

#### ▶ Look at the following pictures, then put (√) or (x):



1 You can stand on ice in barefeet for about 5 minutes. ( )



2 Penguin can walk on ice for a long period of time.
( )

Climate is considered one reason for adaptation of many living organisms over generations.

#### Adaptation of penguins to survive in cold environment:

Unlike most birds, penguins cannot fly but they can stand on ice all day.

#### • Habitat :

Penguin in Antarctica lives in a polar climate that is one of the coldest places on the Earth.

#### Note

Habitat is the environment where living organisms live in.

#### Adaptation :

#### Its body:

Penguin's body is covered with dense feathers and a thick layer of fat to keep its body warm.

#### its feet:

Penguin's feet have no feathers.



بطريق habitat بطريق environment دافئ layer of fat

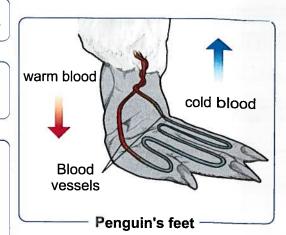
موطن البيئة

barefeet Antarctica dense feathers حافى القدمين penguin القارة القطبية الجنوبية لي ويش كثيف warm

#### How do the penguin's feet stay warm?

The penguin's feet stay warm due to the way of moving the blood in blood vessels through its feet as follows:

- Dlood vessels bring cold blood up from the feet.
- Other blood vessels bring warm blood down to the feet from the feather-coated body.
  - These vessels weave around each other, so the warm blood vessels heat up the cold blood vessels, and the heat transfers to the penguin's feet.



• This adaptation causes that the cold blood moving up into the penguin's body becomes warm and the blood moving down to the penguin's toes is warm enough to keep its toes from freezing.

## Give a reason for :

#### Penguin's feet help it survive in cold climate.

Because blood vessels that carry warm blood from the body weave around the blood vessels that carry cold blood from the feet. This leads to warming the blood vessels of the penguin's feet to survive in cold climate.

#### **Check** your understanding

- ▶ Put (√) or (x):
  - The blood vessels coming downwards to the penguin's feet carry warm blood.
  - 2. Penguins can adapt to live in extreme cold environment by having feathers and fat in their feet.

### **Activity 3** Adaptations for Survival

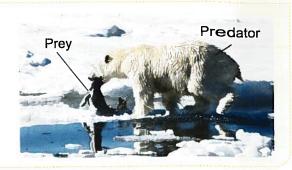
We notice that some animals adapt in many ways to hide from their predators or their preys by a way of adaptation called "camouflage".

#### Camouflage:

It is a way of adaptation that some animals use to hide from their predators or their prevs by blending in with the surrounding environments.



- 1. Predator is an animal that hunts and eats another animal.
- 2. Prey is an animal that is hunted and eaten by another animal.



▶ Some animals have some adaptations that help them survive and reproduce in their different environments.

#### **Examples:**





Polar bear

- Habitat : Arctic region (polar region).
- Adaptation :

#### It has white and thick fur:

- Its white fur helps it blend in with the snow as it sneaks up on its prey.
- Its thick fur helps it stay warm in its cold arctic region.

#### Brown bear and black bear



Brown bear

Black bear

- Habitat : Forests.
- Adaptation :

They have dark fur to help them hide among the trees when they hunt.

#### 3 Caracal and fennec fox





Caracal

Fennec fox

- · Habitat : Desert.
- Adaptation :
   They have sandy-colored fur
   (tan-colored fur) to help them blend in with desert landscapes.





Desert lizard

- Habitat : Desert.
- Adaptation:
   They have colorful scales
   that make them hide among the colorful rocks in the desert.

## Check your understanding

 See	1/			
Put (	$(\lor)$	or	$(\mathbf{x})$	

- 1. Polar bear has a dark fur to blend in with the snow.
- 2. Brown bear lives in arctic region, while polar bear lives in forest. ( )

#### ▶ Complete the following statements :

- 1. Fennec fox has \_\_\_\_\_ colored fur to help it blend in with desert landscapes.
- 2. The type of adaptation that some animals use to hide from their predators or their preys is known as \_\_\_\_\_

In the Assessment Book : Try to answer :

Self-Assessment (1)

## **Exercises on Lesson 1**

Understand

O Apply

Higher Thinking Skills

1	C	hoose the correct ar	nswer :			
e	1.	The starred agama	keeps cool durin	ng a hot sunny day	in desert by	
		a. eating green veg	etables.	b. drinking more w	ater.	
١		c. drinking less water	er.	d. finding a shade	d area.	
   	2.	Adaptation helps the	e living organism	n in all the following	g characters, <u>ex</u>	cept
		a. surviving.		b. reproduction.		
	•	c. hiding.		d. death.	(	(Cairo 2022)
   	3.	Penguins live in a p	oolar climate whi	ch		
		a. is one of the hott	est places on Ea	arth.		
۱		b. is one of the cold	dest places on E	arth.		
		c. looks like the rair	ny climate.			
		d. looks like the fore	est climate.			
	4.	Which of the followi	ing ways help pe	nguins to adapt to	live in polar clim	ate ?
		a. Their bodies are	covered with ski	in.		
		b. Their bodies are	covered with de	nse feathers only.		
		c. Their bodies are	covered with a t	hick layer of fat on	ıly.	
		d. Their bodies are	covered with de	nse feathers and	a thick layer of fa	at.
	5.	In penguin's feet,				
		a. warm blood vess	sels weave arou	nd cold blood vess	sels.	
		b. warm blood vess	sels weave arou	nd its toes.		
		c. cold blood vesse	els weave around	d its toes.		
		d. cold blood vesse	els weave around	d dense feathers.		
•	6.	Penguin's feet have	blood vessels that	at bring up fro	m its feet toward	s its body.
ı		a. cold water b.	. warm water	c. cold blood	d. warm blood	
	20					(Alex. 2023)
•	7.	The presence of a	thick white fur is	an adaptation in .		(Cairo 2024)
		a. starred agama li	izard.	b. polar bear.		
		c. fennec fox.		d. forest bear.		
	8.	Bears that live in fo	orests have fur	that of polar	bears.	
		a. whiter than b	. darker than	c. similar to	d. brighter than	1

0 Fennes for		
J. I GIIIIGU IUX (	and caracal have that he	elp them blend in with desert
landscapes.		(South Sinai 2023)
a. colorful so	cales b. thick	white fur
c. sandy-col	ored feathers d. sand	y-colored fur
<ol><li>Desert lizard desert.</li></ol>	ls have that make them	hide among the colorful rocks in the
a. tan-colore	ed fur b. color	ful scales
c. sandy col	ored feathers d. dark	fur
1. Camouflage	means that the animal	
a. can be se	en easily among its surround	ing environment.
b. is hard to	be seen among its surrounding	ng environment.
	be seen by its preys.	
d. can be se	en easily by its predators.	
		ult to be seen by its predator ?
	on a green tree. b. A blu	
	ird on a green tree. d. A gre	
	0	3
boose from so	lumps (D) and (C) substants	Alexander and annual (A)
	lumns (B) and (C) what suits	
hoose from co (A) Animal	lumns (B) and (C) what suits  (B)  Adaptation	them in column (A) :  (C)  Helps it to
(A) Animal	(B)	(C)
(A) Animal . Penguin	(B) Adaptation	(C) Helps it to
(A) Animal . Penguin . Caracal	(B) Adaptation  a. has dark fur  b. has thick white fur  c. has thick layer of fat and	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert
(A) Animal . Penguin . Caracal . Brown bear	(B) Adaptation  a. has dark fur  b. has thick white fur	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert landscapes.  D. hide among the trees when it
(A) Animal Penguin Caracal Brown bear Polar bear	(B) Adaptation  a. has dark fur  b. has thick white fur  c. has thick layer of fat and dense feathers	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert landscapes.  D. hide among the trees when it hunts.
(A) Animal Penguin Caracal Brown bear Polar bear	(B) Adaptation  a. has dark fur  b. has thick white fur  c. has thick layer of fat and dense feathers  d. has sandy-colored fur	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert landscapes.  D. hide among the trees when it hunts.
(A) Animal  Penguin  Caracal  Brown bear  Polar bear  ut (✓) or (X):	(B) Adaptation  a. has dark fur  b. has thick white fur  c. has thick layer of fat and dense feathers  d. has sandy-colored fur  2	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert landscapes.  D. hide among the trees when it hunts.  4
(A) Animal  Penguin  Caracal  Brown bear  Polar bear  ut (✓) or (X): The desert liz	(B) Adaptation  a. has dark fur  b. has thick white fur  c. has thick layer of fat and dense feathers  d. has sandy-colored fur  2	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert landscapes.  D. hide among the trees when it hunts.  4  4
(A) Animal  Penguin  Caracal  Brown bear  Polar bear  ut (✓) or (X): The desert liz Animals that I	(B) Adaptation  a. has dark fur  b. has thick white fur  c. has thick layer of fat and dense feathers  d. has sandy-colored fur  2	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert landscapes.  D. hide among the trees when it hunts.  4  4
(A) Animal . Penguin . Caracal . Brown bear . Polar bear . Polar bear  ut (✓) or (X): The desert liz Animals that I cool during ho	(B) Adaptation  a. has dark fur  b. has thick white fur  c. has thick layer of fat and dense feathers  d. has sandy-colored fur  2	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert landscapes.  D. hide among the trees when it hunts.  4
(A) Animal  Penguin  Caracal  Brown bear  Polar bear  (V) or (X): The desert lize Animals that I cool during ho	(B) Adaptation  a. has dark fur  b. has thick white fur  c. has thick layer of fat and dense feathers  d. has sandy-colored fur  2	(C) Helps it to  A. stay warm and hide from preys.  B. keep its body warm.  C. blend in with desert landscapes.  D. hide among the trees when it hunts.  4  4

0	• 4. Penguin's body is covered with dense feathers and a thin layer of fat its body warm.	to keep	(	)
0	5. Thick white fur is an adaptation in bears that live in polar regions.	(Suez 2023	)(	)
0	6. The sandy-colored fur of caracal helps it blend in with snow in po	olar		
	environment.		(	)
0	7. Some types of lizards have colored feathers to help them blend i	n with		
	rocks in their ecosystem.		(	)
4	4 Complete the following sentences by using these words:			
	(camouflage – habitat – adaptation – predator – prey	<b>'</b> )		
	1. The environment where living organisms live in is called			
0	2. An animal that hunts and eats another animal is called ais an animal that is hunted and eaten by another animal			
0	3. The characteristic that helps living organisms to survive and representation ecosystem is known as	roduce in	the	
0	4. Type of adaptation that some animals use to hide from their pred	dators or t	heir	ſ
	preys is known as	(Sharki	a 20	122)
5	Write the scientific term of each of the following:			
	1. A characteristic that helps living organisms to survive and reprod	duce in the	Э	
	ecosystem in which they live.	(		)
•	2. A bird that has a thick layer of fat and dense feathers to adapt	(		١
	extreme cold weather.	`	•••••	·····)
	3. It covers the body of some types of bears to blend in with snow keeps their bodies warm. (Luxor 2)	ariu 023) (		١
	4. A type of foxes that has sandy-colored fur to adapt its desert	020) (	•••••	,
Ĭ	environment.	(		)
	5. A property that helps animals to blend in with their surrounding	`		Í
		022) (		)
6	Complete the following sentences :			
	1. The penguin's body can keep warm through a thick layer of	and		
	dense	(Aswa	ın 20	)23)
	<ul> <li>2. A penguin can stand around on ice all day due to the weaving of around each other in its feet.</li> </ul>	of		
	3. Forest bears have or colored fur, while pola	r bears ha <i>(Caii</i>		)23 <u>)</u>
	4. In desert environment, and are covered with s	andy-colo	red	fur.

	5.	fox.
	6.	The fur of a polar bear is thick to keep its body in polar climate, while it has color to blend in with snow.
	7.	The body of some types of lizards are covered with to blend in with colored rocks in their environments.
)	8.	Among animals that can live in polar environment are and and
		(Beni-Suef 2024)
	9.	Animals can blend in with their surrounding environments to hide from their and preys through property.
7	Gi	ive reasons for :
	1.	The starred agama lizard always looking for shade areas in desert.
	2.	The penguin's body has a thick layer of fat and dense feathers.
	3.	The blood vessels in the penguin's feet weave around each other.
	4.	Some desert lizards have colorful scales.
	5.	Fennec fox has sandy-colored fur, while polar bear has a white fur. (Minia 2023)
	6.	Some animals have the ability to make camouflage adaptation. (Cairo 2024)
3	W	hat happens if?
		The warm blood vessels and cold blood vessels in the penguin's feet do not weave around each other.
	2.	The polar bear has thin fur instead of its thick fur.

3.	The body of t	fennec fox is	s covered	with black	fur.		

4. Some types of lizards are not able to make camouflage adaptation.

#### Compare between :

1.

Points of comparison	Penguin	Fennec fox
1. Habitat :		
2. Body is covered with :		

2.

Points of comparison	Polar bear	Forest bear
1. Habitat :		
2. Fur color :		

## Choose the animals that use camouflage adaptation to blend in with its environment:









a. Deer

b. Frog

c. Cow

d. Lizard

#### 11 Look at the opposite figure, then answer the following questions:

- 1. Caracal lives in ...... habitat.
- 2. It has ...... colored fur, which help it to blend in with surrounding environment, and this property of adaptation is called ......



Caracal

## LESSON TWO [Part A]

## **Activity 4** Types of Adaptations

▶ Look at the following pictures, then put (√) or (x):



Camel's body is covered with a special hairy skin to adapt to live in desert.



- Polar bear has thick white fur to adapt to live in forests.
- In this lesson, we will study types of adaptations and explore these types in some animals.

)

#### Types of adaptations

#### 1. Structural adaptation

#### 2. Behavioral adaptation

#### **Definition**

It is a change in the body structure of a living organism to help it survive.

It is a change in the behaviors or acts of a living organism to help it survive.

#### **Examples**

- The blood vessels in the penguin's feet.
- The thick fur of the polar bear.
- · Desert lizard looks for shade area during hot sunny days.
- Migration of some animals towards certain regions.
- Now, we will study types of adaptations in some different animals.

#### 1 Fennec fox :

Habitat	Structural adaptation	Behavioral adaptation	
Hot dry desert  Fennec fox	<ul> <li>It has a tan-colored coat (sandy-colored fur) that:</li> <li>provides camouflage to hide in a sandy, rocky environment.</li> <li>protects it from the hot Sun.</li> <li>It has extra-large ears to help it lose the heat to cool its body.</li> </ul>	<ul> <li>It pants like dogs to cool its body, where it takes up to 700 breaths per minute.</li> <li>It lives in burrows to stay cool during the sunny days.</li> <li>It eats all kinds of food like insects, fruit, plant roots and even the remains from another animal's prey.</li> </ul>	

#### 2 Arctic fox :

Habitat	Structural adaptation	Behavioral adaptation
Tundra desert with temperature as cold as (50°C) below zero in the winter	- It has a thick fur coat to keep its body warm in extreme cold climate.	- It lives in burrows to stay warm at night.
months.	- Its fur coat is white during winter but turns brown in summer when the snow melts to help it sneak up on prey in any season.	- It eats all kinds of food like insects, fruit, plant roots and even the remains from another animal's prey.
Arctic fox in winter  Arctic fox in summer	- It has short ears and legs to help it stay warm.	

#### **Note**

The special shape of ears in both fennec and arctic foxes allow excellent hearing to help them hunt.

## Give a reason for :

Both fennec fox in hot dry desert and arctic fox in cold tundra eat all kinds of food. Because it is hard to find food in the hot dry desert and in the cold tundra.

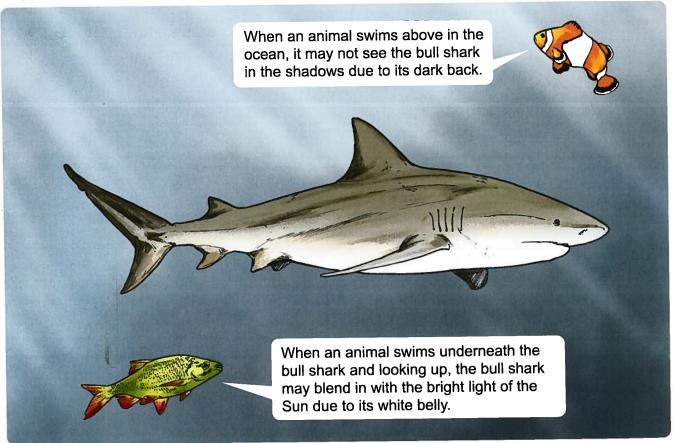
provide pant remains يرود arctic fox يلهث tundra desert coat بقايا الثعلب القطبى صحراء التندرا غطاء

#### 3 Bull shark :

Most sharks can live only in salt water but bull sharks, their bodies have adapted to live in both fresh water and salt water.

Habitat	Structural adaptation	Behavioral adaptation
Fresh water and salt water.	- Its body is adapted to survive in fresh water, where no other sharks live in fresh water, so it has less competition to find food.	<ul> <li>It eats different types of food as it lives in both fresh water and salt water.</li> <li>It hunts during the day and at night, so it can surprise its</li> </ul>
Bull shark	- It uses a camouflage strategy called "countershading", where it has a dark back and white belly to sneak up on prey.	prey.
	- It has sharp teeth to cut its prey's flesh.	

#### Countershading in bull shark:



bull shark	
fresh water	
salt water	
competition	

sharp teeth
countershading
belly
shadow

أسنان حادة	underneath
التباين اللونى	strategy
بطن	flesh
ظل	above

	Check	your	understanding
--	-------	------	---------------

▶ Write	the	scientific	term	

<ol> <li>It is a change in the body structure of a living organism to help it</li> </ol>	elp it survive.	
	()	

2. It is a change in the behaviors or acts of a living organism to help it survive.

# ▶ Use the following structural and behavioral adaptations of the following animals to complete the table below:

Hunts in day and night – Tan-colored coat – Panting – Sharp teeth –
Short ears and legs – Big ears – Can live in fresh water – Countershading –
Camouflage by season

Animals	Structural adaptation	Behavioral adaptation
Fennec fox :	Strong sense of hearing.	Living in a burrow.  Eat different kinds of food.
Arctic fox :	Strong sense of hearing.	<ul><li>Living in a burrow.</li><li>Eat different kinds of food.</li></ul>
Bull shark :	•	Eat different kinds of food.

#### **Activity** 5 The Panther Chameleon

- Lizards are from reptiles that are an ancient type of animals found all over the world in different environments.
- Bodies of reptiles are covered with scales such as starred agama lizard and panther chameleon.

#### Adaptation of the panther chameleon to survive in its environment:

Habitat :

Tropical rainforest.

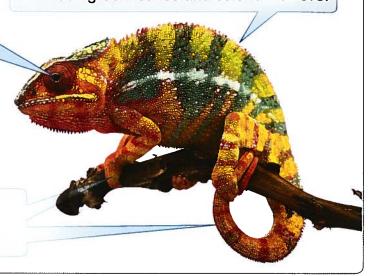
Structural adaptation :

Chameleon eyes can face opposite directions, where each eye can move independently from the other, so:

 One eye can search for food like insects, while the other eye looks out for danger in a different direction.

Chameleon has V-shaped feet and a tail like a hand to hold tightly the branches of trees.

Chameleon has brightly colored scales to help it make camouflage and hide between green leaves and colorful flowers.



#### Behavioral adaptation :

- When chameleon finds itself in danger, it doesn't have teeth or claws for defense, but it can scare its enemies by some other tricks such as:



It puffs up its body



It opens its mouth



It changes the colors of its scales.



lizards reptiles panther chameleon independently

trick الزواحف

scare بشكل مستقل

hold tightly السحالي

enemies الغابات الاستوائية المطيرة tropical rainforest حرباء التمر

puff up تمسك بإحكام

claws حيلة defense خوف مخالب أعداء

دفاع

#### Unit 1 | Concept 1



The panther chameleon can hunt its prey and avoid becoming a prey at the same time.

Because it can search for food with one eye, while its other eye looks out for danger in a different direction.

## Check your understanding

▶ Complete the following table which describes the types of adaptations that help chameleon to survive [put (S) for structural and (B) for behavioral]:

Adaptation	Type of adaptation	This adaptation helps chameleon to
Bright colored scales.		Camouflage to hunt and hide.
V-shaped like feet.		Balance and move.
Eyes move in different directions.		Hunt.
Puffing up its body.		Scare its enemies.
Changing colors.		Defend or survive.

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## Exercises on Lesson 2 (Part A)

Understand

O Apply

Higher Thinking Skills

Choose the correct answer:		
1. The color of fur of fennec fox prote	ects it from	(Alex. 2024)
a. wind.	b. rains.	
c. hot climate.	d. cold weather.	
2. Fennec fox has a tan-colored coa	It that providesin its envir	onment.
a. camouflage	b. respiration	
c. panting	d. communication	
3. Panting in fennec fox belongs to .	adaptation.	(Fayoum 2022)
a. only structural	b. only behavioral	
c. both structural and behavioral	d. neither structural nor beha	vioral
4. Fennec fox and arctic fox live in b	ourrows, this belongs toa	daptation.
a. only structural	b. only behavioral	
c. both structural and behavioral	d. neither structural nor beha	vioral
5. All of the following properties help	fennec fox to stay cool, except	
a. thick fur coat.	b. make panting.	
c. tan-colored coat.	d. extra-large ears.	
6. Changing the color of body coat	of arctic fox according to seaso	n, is
considered as a type of		(Beni-Suef 2023)
<ul> <li>a. behavioral adaptation.</li> </ul>	b. changing the way of breath	ning.
c. structural adaptation.	d. changing the way of drinki	ng.
7. All of the following properties help a	arctic fox to stay warm, except	(Qena 2022)
a. thick fur coat.	b. short ears.	
c. tan-colored coat.	d. short legs.	
8. Both fennec fox and arctic fox are	e similar in all of the following, e	xcept
a. they live in the same habitat.		
b. they can eat different things.		
c. they have excellent hearing ab	ility.	
d. they have different sized ears.		
9. All of the following sentences repr	resent the meaning of adaptatio	n, <u>except</u>
a. it is the characteristic that helps	s living things survive.	
b. it is the characteristic that help	s living things reproduce.	
c. it is the change that helps the a	animal to find a prey.	

d. it is the change that causes the death of the animal.

0	10.	Bull sharks can	live in		(	Giza 2023)
		a. fresh water o	only.	b. salt water		
		c. seas, rivers a	and mud.	d. rivers, s	eas and oceans.	
0	11.	One of structura	al adaptations of b	ull sharks is	that they	
		a. can live in bo	oth salt water and t	resh water.		
		b. can eat differ	rent types of food.			
		c. hunt in the da	ay as well as the n	ight.		
		d. can live in sa	alt water only.			
5	12.	During hunting,	, when a panther c	hameleon s	tands within leaves of tr	ees, the
			es changes into	_		
		a. white		b. green		
		c. blue		d. black		
	13.		•		ng to adaptation.	
		a. only structura		b. only bel		
					structural nor behavioral	
9	14.				on in the panther chame	
			s body during dang			(Giza 2023)
		b. Each eye can move independently				
		c. V-shaped feet				
	4.5	d. Tail like a ha		1	41	
	15.		g are structural ad	aptations in	the panther chameleon,	
		except	n move independe	ntly		
		_	nouth wide during	-		
		c. its V-shaped	_	danger.		
		d. its tail like a				
			Tidi Td.			
2	Ch	oose from colui	mns (B) and (C) wl	nat suits the	em in column (A) :	
		(A)	(B)		(C)	
		Animal	Adaptati	on	Helps it to	
	1.	Chameleon	a. short ears and	legs	A. stay cool.	
	2.	Fennec fox	b. V-shaped feet		B. stay warm.	
	3.	Arctic fox	c. countershading	3	C. balance and move.	

D. hide from its prey.

3. .....

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4. Bull shark

d. panting

3	Put	<b>(</b> ⁄/)	or	(X)	:
---	-----	--------------	----	-----	---

•	1. Living organisms can adapt their environmental conditions through		
	structural adaptation and behavioral adaptation. (Menofia 2022)	(	)
)	2. The behavioral adaptation is a change in the body structure of a living orga	anis	sm
	to survive. (Damietta 2023)	(	)
)	3. When the snow melts in polar regions, the thick fur coat of arctic fox		
	turns black.	(	)
)	4. The ears of arctic fox are larger than those of fennec fox. (Sohag 2023)	(	)
)	5. Fennec fox stays in burrows during day, while arctic fox stays in		
	burrows at night.	(	)
)	6. Both fennec and arctic foxes can eat insects, fruit, plant roots and		
	the remains from other animal's prey.	(	)
	7. Fennec fox has sandy-colored fur to help it make camouflage.		
	(Beni-Suef 2024)	(	)
	8. Arctic fox lives in tundra, while fennec fox lives in hot desert.	(	)
	9. Panting and staying in burrows are considered behavioral adaptations		
	in fennec fox.	(	)
	10. All types of sharks live in fresh water. (North Sinai 2023)	(	)
	11. If a bull shark moves from a river to a sea, it will die.	(	)
ı	12. Bull shark uses countershading camouflage to sneak up on its prey.	(	)
	13. Chameleon uses its tail and V-shaped feet to hunt and move.	(	)
	14. The panther chameleon has teeth and claws, through which it can hunt		
	and eat its prey.	(	)
	15. Starred agama lizard use one of its eyes to search for food and		
	the other one to look out for danger.	(	)

### 4 Complete the following table:

Animal	Its adaptation	Structural or Behavioral adaptation
1	Has blood vessels weave around each other.	
2. Polar bear	Has thick white fur.	Structural
<b>3.</b> fox	Changes the color of its fur.	
<b>4.</b> fox	Hiding inside burrows to stay cool.	
5. Panther chameleon	Has eyes move in opposite directions.	

E	5 Complete the following sentences by using these words :					
	(panting – countershading – reptiles – tundra)					
C	1. Panther chameleon is from that are an ancient type of animals.					
•	2. The camouflage strategy of bull shark which help it to sneak called	up on its prey is				
•	3. Arctic fox lives in desert, where the weather is very	y cold in winter.				
C	4. Fennec fox cools its body by, as it takes up to 700 l	breaths per minute.				
6	6 Write the scientific term of each of the following:					
-	1. A change in the body structure of a living organism to surviv	e. ()				
	2. A change in the behaviors or acts of a living organism to sur	vive. ()				
•		era 2023) ()				
[	4. A way by which fennec fox cools itself like dogs.	()				
	5. A type of foxes that changes its fur color between winter and					
		ex. 2024) ()				
Î	<ul> <li>6. A lizard that has different bright colored scales to provide ca in its environment and has V-shaped feet.</li> </ul>	amouflage ()				
	7. A shape of feet by which a panther chameleon holds tightly	to branches				
	of trees.	()				
	8. A feature in the bull shark, in which the upper surface of its	·				
	darker than its lower surface.	()				
Z	Complete the following sentences :					
d	1. Weaving of blood vessels around each other in penguin's fe	eet is considered				
	adaptation, while migration of birds to certain regi	ons is considered				
	adaptation.	(Assiut 2022)				
•	2. Tan-colored coat in fennec fox is considered adap	otation, while its				
	panting to stay cool is considered adaptation.	(Cairo 2023)				
	3. Among animals that live in hot environments are while foxes live in cold environments.	foxes,				
	4. Extra-large ears allow heat to escape to cool the bodies of while short ears and legs help the foxes stay warr					
0	5. Short ears of arctic fox is considered adaptation,					
	burrows to be warm is considered adaptation.					

6. A burrow is an excellent place for the fox to stay w	arm at night and
for the fox to stay cool during the day.	
7. The fur color of arctic fox is in winter but turns	in summer.
8. The chance of bull shark to find a prey is more easier in	water than
in water.	
9. Countershading strategy of the bull shark is considered	adaptation.
10. Eyes of chameleon move independently of each other, this i	s considered
as adaptation.	(Behira 2022)
11. Chameleon puffs up its body with air for defense which is co	nsidered
adaptation, while its V-shaped feet is considered	daptation.
	(Giza, Cairo 2023)
Give reasons for :	
Fennec fox has a tan-colored coat.	
2. Fennec fox pants like a dog.	(Cairo 2024)
3. Arctic fox has a thick fur coat.	
	(Damitta 2024)
4. The fur of arctic fox is white during winter but it turns brown i	
<b></b>	
5. Burrows are excellent places for arctic and fennec foxes.	
6. Fennec fox has extra-large ears, while arctic fox has short ea	
	,
7. Bull sharks have less competition for finding food in fresh wa	
·	
8. Panther chameleon has V-shaped feet and a long tail.	(Assiut 2023)
·	,
Changing the color fur of arctic fox is considered as structural	
or changing the color fail of arctic lox is considered as structure	λι ασαριατίοπ.

9	What happens if?						
	1. Arctic fox has a brown coat during winter but it turns white during summer.						
	2. Fennec fox has short ears.						
	3. The sense of hearing becomes weak in foxes.						
	4. Arctic fox has only a white coat during all seasons of the year.						
	5. Both eyes of panther chameleo	n move in one direction o	only.				
	6. Panther chameleon is exposed	to danger.					
110	Cross out the odd word:						
•	1. Penguin – Polar bear – Fennec	fox – Arctic fox	(Sohag 2023) ( )				
	2. Fennec fox – Starred agama liza		,				
	2. I ennec lox — Starred againa liza	iu – Fanther Chameleon -	,				
	3. Panther chameleon – Polar bea	ar – Fennec fox – Arctic f	(Alex. 2024)				
11	Compare between :						
	Points of comparison	Fennec fox	Arctic fox				
	1. Habitat :						
	2. Color of fur :						
	3. Shape of ears :						
	4. Time of entrance to burrows :						
12	Put (S) in front of structural adap	tation and (B) in front o	f behavioral adaptation				
•	for each of the following stateme						
	1. Tan-colored coat of fennec fox.		()				
	2. Living of the arctic fox in burrow	vs.	()				
	3. Living of bull shark in both salt	water and fresh water	( )				

4. Countershading of bull shark.	()
5. V-shaped feet of panther chameleon.	()
6. Change the colors of panther chameleon scales in danger cases.	()
Give only one example of behavioral adaptation in each of the followi	ng animals :
1. Fennec fox:	
2. Starred agama lizard :	
3. Bull shark :	. (Gharbia 2024)
4. Panther chameleon :	······································
Look at the following figures, then answer the questions:	
Figure (1)  Figure (2)  1. What is the name of this animal and where does this animal live?	
2. Figure (1) represents this animal in season, while figure (2) ranimal in season.	epresents this
3. Why does the fur color of this animal change between summer and seasons?	winter
4. Mention one structural adaptation and one behavioral adaptation	in this animal
to adapt and survive in its environment :	
- Structural adaptation :	
- Behavioral adaptation :	

## LESSON TWO [Part B]

## **Activity 6 Plant Adaptations**

#### ▶ Look at the opposite picture, then put $(\checkmark)$ or (x):

- 1. Palm tree is adapted to grow and survive in rainforest habitat. (
- 2. Plants have adaptations like animals to be able to survive in different environments.



Palm tree

- Plants can grow in every place that sunlight shines, even the bottom of sea ice in polar regions has tiny plants growing on it.
- Like animals, plants have structural and behavioral adaptations that help them survive and grow in their different environments.
- Now, we will study two different big trees that grow in two different environments which are Savannah and Amazon rainforest.

#### Savannah

#### Such as Southern African Savannah.

- It is a grassland habitat with a mild temperature.
- It is characterized by extreme lack of water during the dry season.
- Acacia tree is a big tree that grows in Savannah.
- Most large plants cannot grow in this habitat due to drought conditions, as the dry season lasts half of the year.



#### Amazon rainforest

#### Such as Amazon rainforest of Brazil.

- It is rainy most of the year, so it is easy to find water.
- It is characterized by **strong winds**.
- Kapok tree is a big tree that grows in Amazon rainforest.
- It is hard for some plants in this habitat to reach sunlight due to the extra tall trees growing up to 70 meters tall.



savannah Amazon rainforest kapok tree grassland

lack of water غابات الأمازون المطيرة المراعى

drought conditions acacia tree شجرة الكابوك

ظروف الجفاف strong winds mild temperature نقص المياه شجرة السنط characterized by extreme

رياح شديدة درجة حرارة معتدلة يتميز بـ

## Adaptation of the two different big trees to survive in their different environments:

- 1 Acacia tree (umbrella-shaped tree)
- Acacia is adapted to survive through many months of drought in its environment as follows:
- Habitat:

Southern African Savannah.

• Structural adaptation :

#### Root

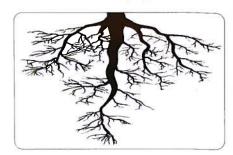
 A very long root called taproot that grows directly downward to search for water as deep as 35 meters below the soil surface.

#### Trunk

- A very long trunk, so most animals except giraffe cannot reach its leaves to feed on.



Acacia tree



**Taproot** 



The trunk in acacia tree stores water as the hump in the camel stores fat.

#### Leaves

- Tiny leaves grow on the top of the tree to help them hold in water, while soaking up (absorbing) sunlight needed to make food.
- There are sharp spines around the leaves to prevent animals from eating these leaves.



Leaves of Acacia tree

#### • Behavioral adaptation :

#### Acacia tree can defend itself as follows:

- It **produces a poison** when an animal begins eating its leaves to make the leaves taste very bad to keep this animal away.
- It **sends a smelly message in the wind** to warn other acacia trees nearby telling them to start making the same poison.

بمنع

#### Kapok tree (umbrella-shaped tree)

- Kapok is adapted to survive in its environment through structural and behavioral adaptations as follows:
- Habitat: Amazon rainforest of Brazil.
- Structural adaptation :

#### Roots

- Large, wide roots called buttress roots.
- Buttress roots are not planted deeply in the ground but they grow high up on its trunk to hold the tree firmly in the soggy soil (wet muddy soil).





Kapok tree

Kapok tree



Note

Buttress roots can start up to 5 meters above the ground.

#### Leaves

Hand-shaped leaves with narrow parts to allow wind to move more gently through the leaves without cutting them.

#### Seeds

- Kapok tree has **fluffy yellow seeds** to be easily carried by wind across the forest.



- Kapok tree has delicious-smelling flowers to send messages through wind to attract bats towards it.





Kapok flowers and seeds

#### **Check** your understanding

#### Choose the correct answer:

- 1. Sending a smelly message from acacia tree to warn other acacia trees is considered adaptation.
  - a. only structural

- b. only behavioral
- c. both structural and behavioral
- d. neither structural nor behavioral
- 2. A structural adaptation of kapok tree is that
  - a. it has delicious-smelling flowers.
- b. it has buttress roots.
- c. it has sharp spines around its leaves.
- d. it has a long taproot.

## **Activity 7 Plant Scientist**

- The scientist who studies plants is known as "botanist".
- Plants have different properties that help them to adapt and survive in their different environments through their structural adaptations shown in the following examples :

Plant	Habitat	Structural adaptation	Reason
Mangrove tree	Salt water	It has long and strong roots.	To resist the water waves.
Water lily	Wetland (Fresh water)	It has wide floating leaves.	To absorb a large amount of sunlight.
Pine tree	Snow	The pine tree has: - a triangular shape and short branches needle leaves.	<ul> <li>To allow the snow to slide easily over it, so its branches don't break.</li> <li>To prevent the loss of water.</li> </ul>
Palm tree	Desert	- It has thick trunk and small leaves.	To resist the strong winds.



Desert

It has sharp spines and tough outer cover.

To prevent animals from eating its leaves and fruits.

Barbary fig

#### ▶ From the previous table, we can conclude that :

- All plants have roots, stems (trunks) and leaves.
- Plants differ in the structure and shape of their roots, stems and leaves to adapt the environmental conditions to survive and grow in their environments.

## What happens if ...?

Some plants are removed from their environment and placed in another different environment.

These plants may die or may adapt the new environmental conditions to survive and grow in their new environments.

#### **Check** your understanding

Pu	t (	<b>√</b> )	or (	(x)	:

1. Palm tree has thin trunk and big leaves.

2. Water lily plant lives in salt water.

3. Mangrove tree has long and strong roots to help the plant to resist the water waves.

> In the Assessment Book: Try to answer:

Self-Assessment (2)

# Exercises on Lesson 2 (Part B)

Higher Thinking Skills

O Apply

Understand

	hoose the correct answer:		
1.	It is difficult for rainforest plants to	get	
	a. water.	b. air.	
	c. sunlight.	d. oxygen.	
2.	One of the behavioral adaptations	of acacia tree is that	(Alex. 2023)
	a. it has one very long root.		
	b. it has sharp spines around its le	eaves.	
	c. it has very tall trunk.		
	d. it produces a poison to make ba	ad tasty leaves.	
3.	Acacia tree trunk and camel hump	<b>,</b>	
	a. both store water.		
	b. both store fat.		
	c. the first stores fat and the secon	nd stores water.	
	d. the first stores water and the se	cond stores fat.	
4.	All of the following properties prote	ect acacia leaves from being eaten	by
	animals, except that		(Minia 2022)
	a. they are high enough.	b. they are surrounded by sharp s	spines.
	c. they are brightly colored.	d. they produce a poison.	
5.	The acacia tree warns the other no by sending	earby acacia trees from animals	
	a. a watery message in the air.	b. a watery message in the water	•
	c. a smelly message in the air.	d. a smelly message in the water	•
6	. When the nearby acacia trees rec tree, which exposed to be eaten b	-	acacia
	a. lose water from their trunks.		
	b. invite bats to eat their leaves.		
	c. make a poisonous substance in	their leaves.	
	d. fall down their leaves.		
7.	Savannah is characterized by all c	of the following, except	
	a. it is a grassland habitat.	b. it is rainy most of the year.	
	c. it has a mild temperature.	d. it has extreme lack of water.	

)	8.	From umbrella-shaped trees are		(Cairo 2023)
		a. mangrove tree and acacia tree.	b. mangrove tree and kapok	tree.
		c. acacia tree and kapok tree.	d. barbary fig and water lily.	
	9.	The roots of kapok tree are not plan	ted deeply in the soil, becaus	se
		a. the soil contains less water.	b. the soil contains more wa	ter.
		c. the climate is very cold.	d. the climate is very hot.	
)	10.	Kapok tree uses the wind to carry its	s fluffy yellow seeds across it	ts
		a. desert habitat.	b. snowy habitat.	
		c. salt water habitat.	d. rainforest habitat.	
)	11.	If a plant grows in a dry desert, it ne	eds to adapt for getting	g water.
		a. long branches	b. long leaves	
		c. long roots	d. more sunlight	
)	12.	If a plant grows in a rainforest, when to adapt for getting more sun		, so it needs
		a. small roots	b. a very tall trunk	
		c. sharp spines	d. a very short trunk	
	13.	If a plant grows in a snow habitat, s characteristics, except to ada		
		a. short branches	b. triangular shape	
		c. needle leaves	d. wide leaves	
•	14.	All of the following are adaptations from them, except that they	of different plants to keep an	imals away
		a. produce poison.	b. have very long trunk.	
		c. have delicious-smelling flowers.	d. have sharp spines.	
	15.	Desert plants are characterized by have	all of the following, except th	at they
		a. small leaves.	b. wide leaves.	
		c. thick trunks.	d. sharp spines.	
	16.	Palm tree has tiny leaves like	··	
		a. pine tree.	b. kapok tree.	
		c. acacia tree.	d. water lily plant.	
	17.	One of the structural adaptations of	f water lily plant is that it has	
				(Giza 2022/2023)
		a. long roots.	b. needle leaves.	
		c. tiny leaves.	d. wide leaves.	

o I	18. Mangrove tree has lon	g and strong roots to(	Sharkia 202	23)
	a. resist the strong win			Í
	c. prevent the loss of w	vater. d. absorb the underground water	r.	
	19. Pine tree has a triangu	lar shape to make snow slides over its brands s structural adaptation makes this tree face	ches	1e
	a. caracal.	b. penguin.		
	c. fennec fox.	d. brown bear.		
)	20. Barbary fig keeps anim	nals away like acacia trees by its		
	a. sharp spines.	b. poison.		
	c. smell.	d. long leaves.		
2	Choose from column (B) v	vhat suits it in column (A) :		\
	(A)	(B)		
	1. Long and strong roots	a. prevent animals from eating barbary fig.		
	2. Wide leaves	b. make mangrove tree resists the water water c. carries the kapok tree's fluffy yellow seed		
	3. Needle shaped leaves	the forest.		
1000	4. Sharp spines	d. allow wind to move more gently through of kapok tree.	the leaves	•
	5. Hand-shaped leaves	e. allow water lilies absorb large amount of f. prevent the loss of water in pine tree.	sunlight.	20.
	1 2	3 5		
3	Put (✓) or (X) :	1.1		-
	1. Plants have structural a	daptation only to help them survive and grov	V	
	in different environments	S. (Fayour	n 2022) <b>(</b>	)
	2. The rain doesn't fall for	6 months in Southern African Savannah.	(	)
	3. The taproot of acacia tre	ee grows deeply downward searching for wa	iter. (	)
	4. Acacia leaves are protection brightly colored leaves.	cted from being eaten by animals as they ha	ive (	١
		ree use wind to send messages.	(	<b>,</b>
0		s-smelling flowers to attract bats towards it.	(	<i>ነ</i>
9		kapok tree is considered as a behavioral	`	,
	adaptation.		ia 2023) <b>(</b>	)

•	8.	. Kapok tree produces fluffy yellow seeds, this is considered as			
		a structural adaptation.		(	)
)	9.	. One of the structural adaptations of acacia tree is that it has large, wi	de		
		roots called buttress roots. (Sohag 2	023)	(	)
	10.	. Mangrove trees adapt to resist the water waves through their long, st			
		roots. (Sharkia 2	022)	(	)
	11.	Water lily has wide leaves to absorb a large amount of sunlight.		(	)
	12.	. Pine trees that live in desert habitat have needle leaves to prevent the	е		
		loss of water.	_	(	)
5	13.	. Having thick trunk is a behavioral adaptation of palm trees to resist st winds.	trong	) (	)
i	14.	. Animals can't eat barbary fig due to its sharp spines. (Damitta 2	2024)	(	)
	15.	. Some plants can store water to adapt the drought conditions			
		in dry habitats.		(	-)
	16.	. Some plants have sharp spines to absorb a large amount of sunlight		(	)
4	Wr	rite the scientific term of each of the following:			
	1.	A tree that grows in Southern African Savannah and it has sharp			
		spines around its leaves. (	••••••	· • • • • •	)
1	2.	A structural adaptation of acacia tree that allows it to search for water. (	••••••		)
	3.	A structural adaptation that surrounds the leaves of acacia tree to pre	vent		
		animals from eating them. (.	•••••		)
  -	4.	A tree that grows in Amazon rainforest of Brazil and it has			
		hand-shaped leaves. (.			)
•	5.	A structural adaptation that fixes the kapok tree in soggy soil and			
		support its trunk. (Red Sea 2023) (.		•••••	)
	6.	The part of the kapok tree on which the buttress roots can grow. (		•••••	)
	7.	A tree lives in salt water habitat and has long, strong roots to resist			
		the water waves.			)
•	8.	A plant lives in wetland habitat and it has wide leaves to absorb			
		a large amount of sunlight. (			)
-	9.	A structural adaptation in water lilies that helps them absorb a large at	moun	ıt	
		of sunlight. (			)

Î	10. A structure that prevents the loss of water in the pine tree.	(
	11. The scientist who studies plants.	(
3	Complete the following sentences :	
	Acacia tree defends itself by producing that makes its lead bad taste, while chameleon defends itself by puffing up its	ves have with air.
2	2. Kapok tree grows in Amazon rainforest habitat which has	
	B. The hand-shaped leaves of kapok tree allow to flow throu	
	gently.	(Gharbia 2023)
4	. The kapok tree spreads the smell of its flowers to attract	towards it.
		(Alex. 2024)
5	. Among the plants that can survive in habitats that have lackage of	water are
6	The leaves of tree in hot weather habitat hold in water, we needle leaves of tree in snowy habitat prevent the loss of	
7	. The leaves of water lilies are wide in order to on the water and to absorb a large amount of	
8	. Drought regions are characterized by lacking of so, their by having very long	olants adapt (Gharbia 2024)
9	. The structural adaptation of tree can resist water waves, structural adaptation of tree can resist strong winds.	while the
10	The leaves of plant allow it to absorb a large amount of s the leaves of tree allow wind to move easily through thes without cutting them.	unlight, while
	iive reasons for :	
1	. Acacia tree has very long trunk.	
2	Acacia trao has sharp spines around the Laure	
	Acacia tree has sharp spines around its leaves.	(Alex. 2024)
3	Wind is important to acacia tree.	
4	Kapok tree has hand-shaped leaves.	
•		

	5. Kapok trees stay firmly rooted in the soggy soil although they are ve	ery tall.
	6. Pine tree has a triangular shape and short branches.	
	7. Water miles that o meeting seems	(Sharkia 2022)
0	8. Mangrove tree has long and strong roots.	(Cairo 2023)
0	9. Palm trees have thick trunk and small leaves.	
0	10. Barbary fig has sharp spines.	(Sharkia 2023)
7	What happens if?  1. The length of acacia taproot doesn't grow for more than 3 meters of	lownward.
	2. The acacia leaves are not guarded by sharp spines.	
	3. There are no buttress roots in the kapok tree.	
	4. The pine tree has an umbrella shape not a triangle shape.	
	5. Some plants of rainforest habitat became very short.	
	6. Water lily has narrow leaves instead of wide leaves.	
	7. Palm tree has thin trunk and large leaves.	
E	Cross out the odd word :	
-	1. Taproot – Tiny leaves – Buttress roots – Producing a poison.	()
	2. Taproot – Hand-shaped leaves – fluffy yellow seeds – Buttress roots	
	3. Fennec fox – Barbary fig – Palm tree – Polar bear.	()

			Exercises	on lesson 2 (Part B)
4. Acacia tree – Polar bea	r – Penguin – Pine	e tree.	(Menof	ia 2024) (
Compare between :				
1.				
Points of comparison	Acacia tre	e	K	Kapok tree
1. Type of roots :				
2. Shape of leaves :				
2.				
Points of comparison	Kapok tree	Water li	ly plant	Pine tree
1. Habitat :				
2. Shape of leaves :				
Palm tree – Barbary fig pl Organisms live in		Orgai	nisms liv	e in forests
	- No. 100 01			
••••••			••••••	
•••••••••••••••••••••••••••••••••••••••		•••••		
••••••		••••••	•••••••	
		•••••	•••••	
.ook at the opposite figu vords below :	re, then answer t	ne followi	ng questi	ons using the
(animals – s	pines – desert –	tough – le	eaves)	
. Barbary fig can grow in	habitat.			San San
. Its leaves have sharp	and			
outer cover.				
. The spines of leaves pro				
eating its	event fro	om		Barbary fig

# **LESSON THREE**

# **Activity 8** Digestive System

#### ▶ Look at the opposite figure, then put $(\checkmark)$ or (x):

- Living organisms can live without food for many weeks.
- Food provides our bodies with the needed energy and help us to grow.( )



### How do body systems adapt to meet the needs of living organisms?

- Each living organism has different ways to adapt to live in its environment, so :
  - The body of a living organism (human or animal) is made up of systems such as digestive system, respiratory system, nervous system, .... etc.

#### System:

It is a group of organs that work together to perform a specific job (function).

### **₽**Note

Digestive system and respiratory system are working together to get energy from food and breathing.

- In this lesson, we will study:
  - · Human digestive system.
- Human respiratory system.
- ▶ Why do we need to eat food ?

"Because food contains different nutrients (vitamins, proteins, .. etc.) that give us energy to :

- do activities as walking, talking and even during sleeping.
- do body function as heart beating, breathing and thinking.

#### Note

in one day, your body needs a lot of energy, so:

- your heart beats around 100,000 times.

- you breathe over 20,000 times.

### **Human digestive system:**

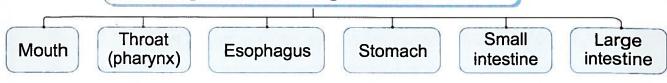
 The digestive system breaks down food into smaller parts that your body can use in a process called digestion process.

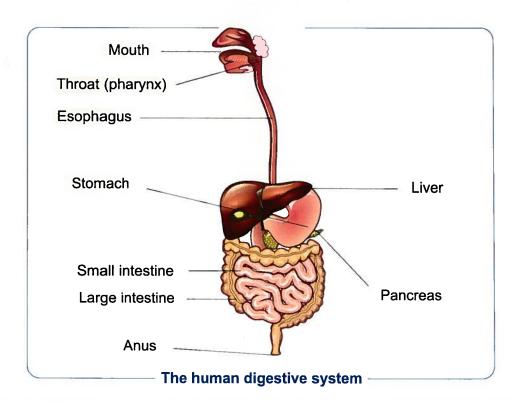
#### Digestion process:

It is a process of breaking down food into smaller parts that the body can use them to get energy and grow.

#### The structure of the human digestive system:

The human digestive system consists of a group of organs that work together which are:





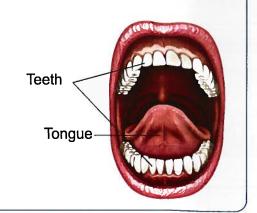


Digestive system starts with mouth and ends with anus.

### Description and function of organs of human digestive system:

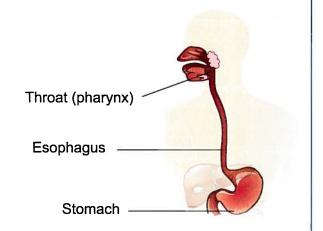
#### Mouth

- Digestion process begins in the mouth.
- Mouth contains :
  - Teeth: They crush (grind) food during chewing.
  - Saliva: It is a liquid substance in the mouth.
    - It moistens food and begins to break it down.
  - Tongue: It mixes food with saliva in the mouth.



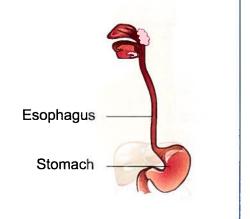
#### Throat and esophagus

- Throat:
- It pushes the food into a tube called esophagus.
- It is a common cavity between esophagus (digestive system) and trachea (respiratory system).
- Esophagus :
- It is a long muscular tube.
- It allows the food to move from throat down into the stomach.



#### **Stomach**

- It is a muscular organ.
- It mixes food with the stomach acid and digestive juices (enzymes) found in it to change the food into a soupy liquid.
- Food stays in the stomach for few hours, then the muscles of the stomach move the food into a long, winding tube called small intestine.



description saliva long muscular tube muscular organ

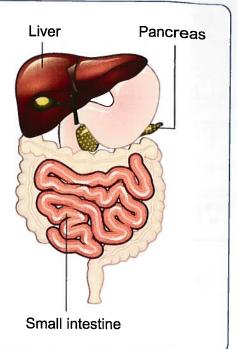
stomach acid وصف enzymes اللُعاب function substance

crush حمض المعدة chew أنريمات digestive juices moisten

سحق مضغ عصارات هضمية مُبلل

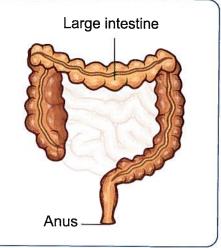
#### **Small intestine**

- It is a long, winding tube as its length is more than six meters.
- The juices of pancreas and liver flow into the small intestine and help in breaking down the food into nutrients (or digested food).
  - The walls of the small intestine absorb these nutrients through tiny blood vessels to carry them to all body parts.
- The body does not benefit from some parts of food known as undigested materials that flow into the large intestine.



#### Large intestine

- It is a tube that starts from the end of the small intestine and ends with the anus.
- It absorbs water from the undigested materials, so they become solid waste materials that leave the body through the anus.
- There is no digestion process occurs in the large intestine.



### 🖁 Note

The organs of the human digestive system have different structures to do different functions and this considered as structural adaptation.

# What happens if ...?

One of the organs of the digestive system is absent.

The digestive system could not do its function correctly.

# ► Comparison between the functions of the stomach, small intestine and large intestine :

The stomach	The small intestine	The large intestine
Mixing food with the acid and digestive juices to change it into a soupy liquid.	Breaking down of food into nutrients by the help of the juices of liver and pancreas.	Absorbing the water from undigested materials.



#### How can you keep the digestive system healthy?

- 1. Drinking a lot amount of water.
- 2. Chewing the food well.
- 3. Don't eat much fast meals.

# Check your understanding

- ▶ Put each of the following words in front of its suitable sentence : (Stomach – Large intestine – Digestive system)
  - 1. It mixes food with acid and digestive juices.
  - 2. A system that breaks down food into smaller parts.
  - 3. It absorbs water from the undigested materials.



# **Activity 9 Respiratory System**

### **Human respiratory system:**

- Our bodies need oxygen in order to do their functions.
- We get oxygen gas from the air around us all the time.
- The respiratory system is the system responsible for breathing (respiration).
- The respiratory system supplies the body with oxygen gas and gets rid of carbon dioxide gas through the respiration process.



#### **Respiration process:**

It is a process of pulling air in (inhalation) and pushing air out (exhalation) of the body.

#### Notes

- Carbon dioxide gas produced during respiration process is a waste product.
- Carbon dioxide gas is harmful to our bodies so, we must expel it out during exhalation.

## The structure of the human respiratory system :

Trachea

The human respiratory system consists of a group of organs that work together which are: Throat

Two

bronchi

exhalation harmful

responsible

nose

Nose

trachea inhalation ضار get rid of supplies مسئول عن

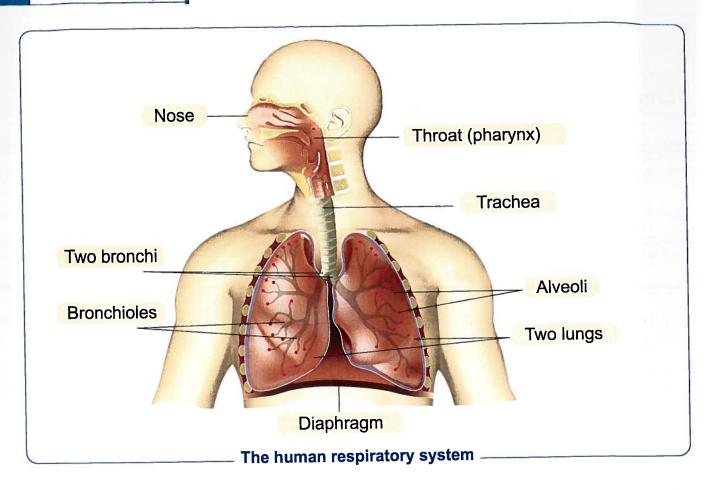
(pharynx)

expel out القصبة الهوائية two bronchi شهيق diaphragm يتخلص من یمد / یزود

Two lungs

الشعبتان الهوائيتان الحجاب الحاجز

Diaphragm



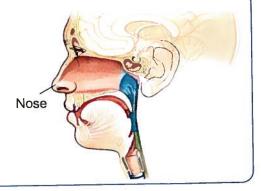
### How does the respiratory system work?

#### Nose:

It is the first organ of the respiratory system through which the air enters the body.

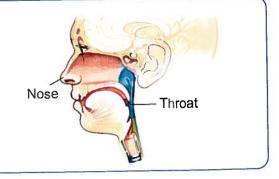
### **Note**

The air can enter the body through the nose and the mouth.



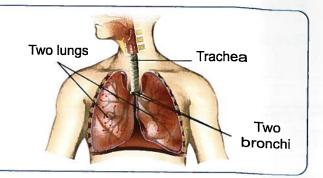
#### Throat:

It allows the air to pass from the nose to the "trachea"



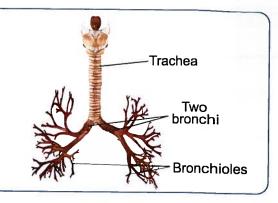
#### Trachea:

- It is a tube that allows air to pass into the "two lungs" which fill up with air like two balloons.
- Inside the lungs, the trachea is branched into two tubes known as "two bronchi".



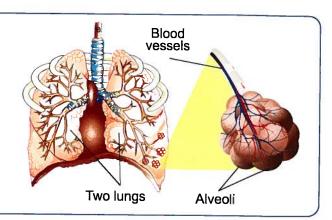
#### Two bronchi:

- They allow the air to enter the two lungs.
- They are divided into smaller and smaller tubes that look like the branches of a tree known as "bronchioles".



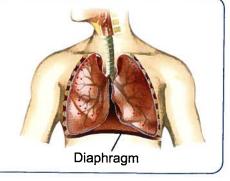
#### Two lungs:

- Inside the lungs, the bronchioles end with little air sacs, surrounded by blood vessels known as "alveoli".
- Inside the blood vessels, oxygen moves into the blood which carries oxygen around the body to help other organs and systems to work.



#### Diaphragm:

 It is a large muscle at the base of ribs which plays an important role in inhalation and exhalation.



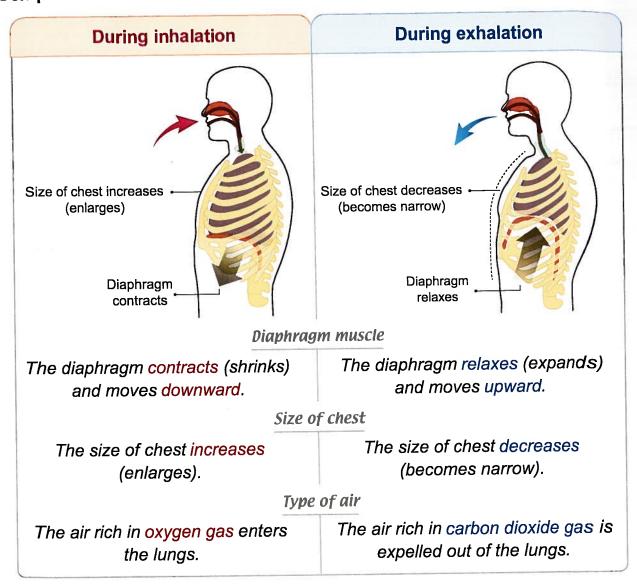
### 🖓 Note

The organs of the human respiratory system have different structures to do different functions and this is considered as structural adaptation.

### How does the respiration process take place?

#### Respiration process includes:

- 1. Inhalation (breathe in).
- 2. Exhalation (breathe out).
- Comparison between inhalation and exhalation :





### How does the respiratory system get oxygen to the body cells?

Oxygen enters the lungs during inhalation, then the blood carries oxygen to all the body cells.

relax يتمدد

# Check your understanding

#### ▶ Put (√) or (x):

- 1. During inhalation, the diaphragm muscle relaxes and moves downward. ( )
- 2. Respiration process starts with mouth and ends with anus.

#### ► Complete:

- 1. Respiration process includes and
- 2. The process of pulling air in and pushing air out of the body is called \_\_\_\_\_\_ process.

In the Assessment Book:
Try to answer:
Self-Assessment 3



# **Exercises on Lesson 3**

Understand

O Apply

Higher Thinking Skills

1		oose the correct				
	1.	The energy that	the living organis	m needs to perfor	m different funct	ions is
		obtained from				
		a. breathing only	y.	b. food processin		
		c. breathing and	d running.	d. breathing and	food processing	
	2.	All of the followi	ing are organs of	the digestive syste	m, <u>except</u>	(Suez 2024)
		a. mouth.	b. nose.	c. stomach.	d. esophagus.	
	3.	Digestion proce	ess begins in the			(Giza 2023)
		a. stomach.			d. small intesti	ine.
	4.	Which of the fo	llowing organs do	es not share in bre	eaking down of t	ood ?
		a. Mouth.		c. Lungs.		
	5.	Crushing the fo		is the function of		(Behira 2022)
		a. stomach.		c. saliva.	d. teeth.	
	6.	. All of the follow	ring are correct ab	oout the mouth, ex	cept	
			organ in the diges			
		b. it has teeth.	_	c. it has tongue.		
			d directly to the st	tomach.		
ļ	7			ood become soft a	nd moisten with	the help
	-	of				
		a. teeth only.		b. tongue only.		
		c. teeth and es	sophagus.	d. teeth and ton	gue.	
	8	. The throat is c	onnected to the s	tomach through	•••••	
				c. small intestin		tine.
4	9			into the stomach is		(Alex. 2023)
		a. mouth.		c. esophagus.		stine.
Š,	10	). The food pass		ach to the di		
				e c. large intestin		
	11			th to help in		<del>d</del> .
		a. digestive ju		b. stomach acid		
		<del>-</del>	digestive juices		d and digestive	juices
	1		_			

1:	2.	The liver and	pour their juid	es into the small in	ntestine.	
		a. throat	b. esophagus	c. large intestine	d. pancreas	
1:	3.	The long windir	ng tube that its leng	th is about more th	an six meters is	called
		a. large intestir		b. small intestine		
		c. esophagus.		d. stomach.		
14	4.	The undigested	d food pass from ti	he small intestine i	nto the	(Suez 2022
		a. liver.		c. brain.		
18	5.	In the large inte	estine, is abs	sorbed from the un	digested food.	
		a. starch	b. fat	c. water	d. oil	
16	3.	The solid waste	e materials of undi	gested food becon	ne useless to th	e body.
				side through the		3.
		a. mouth.		b. anus.		
		c. large intestin	e.	d. small intestine	•	
17	7.	All organs of th	e human digestive	system are consi	dered asa	daptation.
		a. only structura		b. only behaviora		
		c. structural and	d behavioral	d. neither structu	ral nor behavior	al
18	3.	During inhalation	on, air enters throu	igh then dow	n the throat.	
		a. nose and tra		b. nose and mout		
	•	c. mouth and lu	ings	d. mouth and trac	chea	
19	). '	The passage of	f air during inhalati	ion is		(Cairo 2023)
	ć	a. throat – nose	e – lungs – trachea	<b>1.</b>		•
	ı	b. trachea -thro	oat –lungs – nose.			
	(	c. lungs – nose	- throat - trachea	l <b>.</b>		
	(	d. nose – throat	t – trachea – lungs	<b>3.</b>		
20		The throat is co	nnected to the lun	gs through		
				c. small intestine.	d. ribs.	
21				f the smaller air pa		ioles)
			r sacs surrounded		3-1 (3.0	,
	ε	a. air.	b. water.	c. small intestine.	d. blood vesse	ls.
22	. 1	nside the lungs	, the trachea is br	anched into two tu	bes known as	•••••
		ver o		c. bronchi.		
23	. 7			nto blood at the		
				c. trachea		

<ol> <li>All of the following land</li> <li>a. diaphragm relaxe</li> </ol>	
c. diaphragm move	es upward. d. the size of chest decreases.
Choose from column (	(B) what suits it in column (A) :
(A)	(B)
1. Esophagus	a. absorbs water from the undigested food to become
2. Small intestine	solid waste materials.
3. Large intestine	b. mixes the food with an acid and digestive juices.
	c. digestion begins in it. d. is a long winding tube, its length is more than 6
4. Stomach	meters.
5. Mouth	e. is a muscular tube that moves the food down into
	the stomach.
	f. solid wastes leave the body through it.
1 2	
2.	
(A)	(B)
1. Trachea	a. is a large muscle at the base of the ribs and helps in
2. Blood	inhalation and exhalation.
3. Diaphragm	b. are like balloons and they contain little sacs surrounded by blood vessels.
, -	c. carries oxygen to all the body organs.
4. Lungs	d. is a tube through which air travels down into the lungs.
	a six enters the hedy through them
	e. air enters the body through them.
12	3 4

2. The human body gets oxygen gas from food.

the digestive system.

intestine.

3. Mouth, nose, esophagus and stomach are from the organs of

4. The food passes through the large intestine before it goes into the small

(Sohag 2022) (

	5.	Digestion process begins in the stomach with the help of saliva. (G	iza 2023	) (	)
	6.	Tongue and teeth moisten the food, while saliva crushes the food			
		until it becomes soft.		(	)
	7.	Food passes from mouth to stomach through a narrow tube know	n as		
		small intestine. (Qe	na 2022)	(	)
	8.	Food usually stays in stomach for few hours until it becomes a so	иру		
		liquid.		(	)
	9.	Stomach mixes the food with juices that come from liver and pane	reas.	(	)
•	10.	The food gets broken down into nutrients in the small intestine.		(	)
	11.	The walls of the small intestine absorb the nutrients through tiny b	lood		
		vessels then blood carries them to all the body parts.		(	)
٠	12.	Drinking a lot amount of water keeps the digestive system healthy	<i>/</i> .	ì	)
		Digestive system ends by anus.		ì	Ì
		The air travels down into the lungs through esophagus.		,	- / - \
		During inhalation, the size of chest becomes narrow.		1	ر ۱
		Displace and a last of the state of the stat	ag 2022)	1	) \
		The inhaled air is rich in carbon dioxide gas, while the exhaled air		(	,
			fia 2023)	,	`
	13		na 2023)	'	<i>'</i>
١	Wri	ite the scientific term of each of the following :			
•	1. A	A system that helps in breaking down food into smaller parts.	(	• • • • • • • • •	)
2	2. A	A group of organs that work together to perform a specific job.	(		)
3	3. <i>A</i>	A process of breaking down food into smaller parts that the body			Ĭ
		can use to get energy and grow. (Cairo 2023)	) <b>(</b>		)
2	4. T	he organ, where the digestion process begins.	(		)
		hey present in the mouth and play an important role in crushing	•		•
		of food.	(		)
6	3. A	A liquid substance in your mouth that moistens the bite of food and	-		•
	_	egins to break it down.	· (		.)
7	7. T	he organ which receives the food from esophagus.	(		
		an organ that has tiny blood vessels to absorb the nutrients throug	•		•,
		s walls.	(		.)
9	). A	an organ through which solid waste of digestion process leave the	•		7
		(Luxor 2023	•		`

	10.	A long muscular tube that moves the food down into the stomach. ()
9	11.	A process of pulling air in and pushing air out of the body. ()
	12.	It allows the air to pass from the nose to the trachea. (Alex. 2023) ()
	13.	A tube that allows air to pass into the two lungs.
	14.	Little air sacs surrounded by blood vessels in the respiratory system.
		(Behira 2024) ()
	15.	A large muscle that contracts during breathing in and relaxes during
		breathing out. (Beni Suef 2022) ()
0	16.	The common organ between digestive system and respiratory system.
		()
5	Co	mplete the following sentences:
•	1.	The human body uses system to get nutrients from food and
١		uses system to get oxygen from air.
	2.	In order for food to become soft, the grind the food well and the
		mixes it with saliva.
1		In the digestive system, food becomes a soupy liquid in the, while it
		breaks down into nutrients in
		The is a tube that has muscles to move the food down into the stomach,
		while is a long winding tube, its length is more than six meters.
•	5.	The longest part of the digestive system where most digestion takes place inside it is
•	6.	The small intestine receives juices from and that help in
		digestion process.
•	7.	The walls of the small intestine absorb the digested food and transfer it into
		your blood stream through
	8.	In the digestive system, intestine absorbs the nutrients through its wall, while intestine absorbs water from the undigested food. (Behira 2024)
-	9.	Air enters and exits the human body through system. (Cairo 2022)
		Inside the lungs, the end with little air sacs known as
		During inhalation, air travels down from your throat to your lungs
		through (Giza 2023)
	12.	At the base of your ribs, there is a large muscle that plays an important role in
	ן 1	respiration process known as

<ul> <li>13. During inhalation process, the diaphragm contracts a while during exhalation process, the diaphragm expa</li> </ul>	·
Willio daring exticiation process, the diaphilagin expe	(Menofia 2022)
Give reasons for :	
1. The human body is made up of different systems.	
2. The importance of juices of liver and pancreas.	
3. Anus is an important organ in the digestive system.	
4. The inhaled air differs from the exhaled air.	(Suez 2023)
5. Diaphragm plays an important role in respiration proc	
What happens if?	
1. The small intestine is removed from the human body.	
2. The nutrients absorbed by the walls of small intestine er	nter the tiny blood vessels.
3. The diaphragm moves downward during inhalation.	(Minia 2023)
4. The diaphragm moves upward during exhalation.	(Cairo 2023)
8 Cross out the odd word :	
1. Saliva – Stomach – Esophagus – Small intestine.	()
2. Mouth – Lungs – Stomach – Large intestine.	(Cairo 2024) ()
3. Nose – Throat – Trachea – Anus.	(Alex. 2023) ()

# Using the following table, mention the name of the tube-shaped organs of the digestive and respiratory systems inside our bodies:

(A)	(B)
Organ (1):	through which food passes to the stomach.
Organ (2):	in which the absorption of nutrients takes place.
Organ (3):it ends with anus.	
Organ (4):	it connects the throat with the two lungs.

### 10 Compare between:

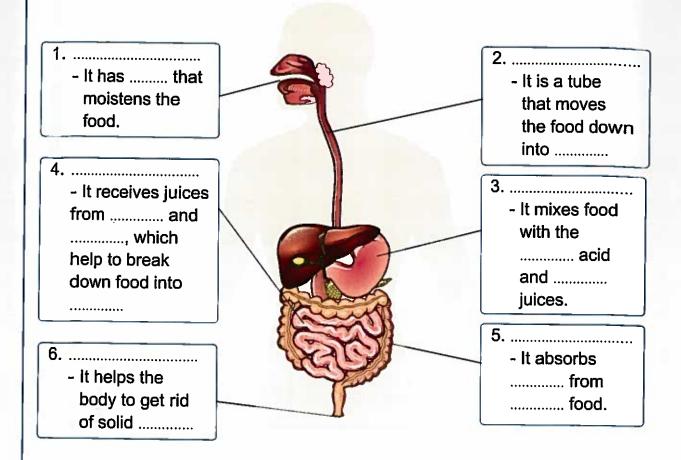
(Cairo 2022)

Points of comparison	Inhalation	Exhalation
1. Diaphragm movement :		
2. Size of chest cavity :		
3. The air is rich in :	gas.	gas.

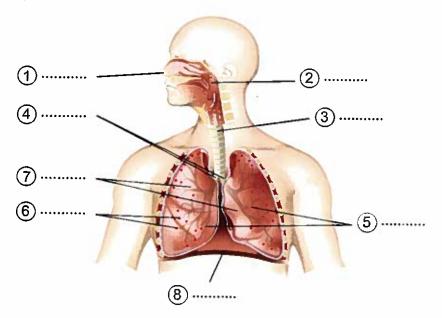
# Put (\(\nu\)) in front of the name of the system to which each of the following organs belongs :

The same	The system		
The organ	Digestive	Respiratory	
1. Trachea			
2. Anus			
3. Stomach			
4. Lungs			
5. Small intestine			
6. Esophagus			
7. Diaphragm			
8. Nose			
9. Large intestine			
10. Liver			
11. Pancreas			
12. Throat			

Look at the following figure which represents the human digestive system, then mention the name of each organ and complete the sentences below:



Look at the following figure which represents the human respiratory system, then label it:



# **LESSON FOUR**

# **Activity 10 How Fish Breathe**

▶ Look at the following pictures, then put (√) or (x):



Human can stay and breathe under water all the time.



2 Fish can stay and breathe under water all the time.

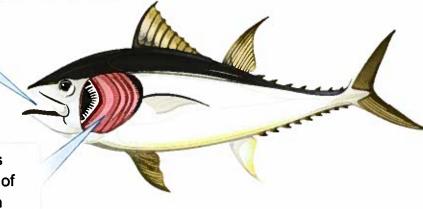
### Structural adaptation of fish:

- Unlike human, fish don't breathe using lungs, but they have gills to breathe.
- Gills are considered as unique structural adaptation that allow fish to live and breathe under water.
- Gills are found on both sides of a fish's head.

### How do fish breathe under water?

Water enters the mouth of the fish and passes across the gills that extract oxygen gas from water.

Blood vessels inside the gills carry oxygen gas to the rest of the body and release carbon dioxide gas.





Fish need clean water to survive, as we need to breathe clean air to stay healthy.

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# Check your understanding

► Compare between the human respiratory system and the fish respiratory system using these words :

(carbon dioxide - blood - oxygen - air - lungs - water - gills)

Points of comparison	The human respiratory system	The fish respiratory system	
Similarities :	- Both of them inhale gas.  - Both of them exhale gas.  - In both of them, carries oxygen gas to all the body parts.		
Differences :	- Humans have to inhale oxygen gas from oxygen gas from		

Di	ıt.	1./	or (	(4)	
r	T.	(V)	י זט ו		

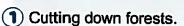
1. The importance of gills to fish is like that of lungs to human.	(	)
2. Oxygen gas reaches all parts of the fish's body through the bloo	d vessels	
present in its gills.	(	)
3. Carbon dioxide gas is harmful for both fish and human.	(	)
4. The type of adaptation in fish's gills is considered as behavioral		
adaptation.	(	1

## **Activity 11 Humans Change the Environment**

- Human activities cause changes or impacts in the ecosystem over time, so organisms will have to adapt these changes to survive.

### Human activities that cause changes in the environment:







Farming and clearing lands.



**Building communities** instead of grasslands.



4 Introducing plants and animals into the environment that were never part of the ecosystem.



Air pollution that is caused due to the exhausts from cars and some factories.



6 Water pollution that is caused due to bad habits, such as throwing waste materials to waterways and soil.

### Note

Changes resulted from human activities can cause the disappearance (extinction) of plants and animals that once lived in an environment.

# Give a reason for:

Although the air, water and soil get polluted as a result of human activities, plants and animals can survive.

#### Because:

- Some animals can survive by moving to another ecosystem to find what they need.
- Plants depend on their seeds to land in a better place for them to survive and grow.

 As the human activities have negative effects on animals and plants, they also have negative effects on human such as:







1 Damage of lungs.

2 Asthma (breathing difficulty).

3 Heart diseases.

### **Notes**

- 1. Water pollution makes the human hard to find clean drinking water.
- 2. Air, water and soil pollution make the crops cannot grow.
- 3. Air pollution (smog) makes the human hard to breathe.
- **4.** People live in cities that have high air pollution level must change their lifestyle to decrease air pollution.

### The role of human to help restore ecosystem:

- As humans can cause harmful changes, they can help restore their ecosystems by :
  - Replanting the cleared forests.
  - Removing the pollutants of air and water.
  - Preserving plants and animals in these ecosystems.

# Check your understanding

#### ▶ Put (√) or (x):

Water pollution affects fish, but doesn't affect humans and plants.

2. Humans must keep air, water and soil clean.

In the Assessment Book : Try to answer : Self-Assessment 4

# **Exercises on Lesson 4**

Understand

O Apply

Higher Thinking Skills

)	Cł	noose the correct answer:			
	1.	Both of human and fish			
		a. can breathe in air.	b. can breathe in v	vater.	
		c. use oxygen gas to breathe in.	d. use carbon diox	ide gas to bre	athe in.
	2.	Fish use to breathe in water.		(Sohag 2022/	Sharkia 2023)
		a. tail b. eyes	c. lungs	d. gills	
	3.	Gills differ from lungs, in that gills .			
		a. take in oxygen gas.	b. expel out carbo	n dioxide gas.	
		c. extract oxygen gas from water.	d. extract oxygen	gas from air.	
	4.	Gills in fish are considered as	••		(Behira 2024)
		a. behavioral adaptation.	b. structural adap	tation.	
		c. camouflage adaptation.	d. behavioral and	structural ada	ptations.
	5.	. All of the following human activitie	es can negatively a	ffect the nature	€,
		except			
		a. cutting down forests.	b. removing air po	ollutants.	7
		c. farming and clearing lands.	d. throwing waste	es in waterway	S.
1	6	. Human activities and bad habits	can pollute of	an ecosystem	l <b>.</b>
١		a. air and soil only	b. soil and waten	ways only	
		c. air and waterways only	d. air, soil and wa	aterways	
	7	. Pollution of an ecosystem can affe	ect		
		a. plants and animals only.	b. animals and h	umans only.	
١		c. humans and plants only.	d. plants, animal	s and humans.	•
!	8	. If the environment is changed, pla	ants to survive	e and grow.	
1		a. must have a taproot			
١		b. must have buttress roots			
١		c. must decrease their adaptation	1		
		d. must land their seeds in anothe	er better place		
1	Ę	. From the negative effects of hum	an activities on the	human health	are
		a. lung damage and asthma.	b. wounds and a		
		c. heart problems and wounds.	d. lung damage	and wounds. (	Qalyoubia 2022)

10. Human can help restoring ecosystem by all of the following activities, except		
a. replanting the cleared forests.		
b. removing air and water pollutants.		
c. producing more factories exhausts.		
d. preserving existed plants and animals.		
a. procerving existed plante and arminals.		
Put (✓) or (X):		
1. Human breathes using gills, while fish breathes using lungs.	(	)
2. Gills are found on one side of a fish's head.	(	)
3. Both of lungs and gills take carbon dioxide gas inside the body and release oxygen gas outside the body.	(	)
4. Gills are unique structural adaptation that allow fish to live and breathe under water.	,	`
5. As human needs clean water to drink, fish needs clean air to breathe.	(	)
	(	)
6. Cutting down rainforests may cause disappearance of starred agama.  7. Throwing wests materials in waterways is one of the had behits	(	)
<ol><li>Throwing waste materials in waterways is one of the bad habits that must be stopped.</li></ol>	(	)
8. The way of survival of animals differ from that of plants, if the ecosystem is changed.	(	)
9. Pollution is one of the most dangerous problems that affect all living organisms.	(	)
10. Respiratory problems like lung damage and asthma occur when water	,	`
pollution is high over a long period of time.	(	)
11. Humans can restore ecosystem as well as they can harm it.	(	)
12. When the pollution level in a city is very high, people are forced to change their lifestyle.	į	١,
Change their mestyle.		
Correct the underlined words:		
1. Fish use gills to extract carbon dioxide gas from the water.		
(Menofia 2022) <b>(</b>	•••••	)
2. <u>Air</u> enters the mouth of a fish and then passes across the gills. (	•••••	)
3. Blood vessels of lungs and gills are similar in carrying carbon dioxide gas to all the body parts.		)
4. Gills are unique behavioral adaptation that allow fish to breathe under water.  (Damitta 2024) (		•
5. When an ecosystem is completely polluted, animals only are affected. (		•
6. Water pollution is caused due to the smoot of factories and cars. (		, 1

4	W	rite the scientific term of each of the following:	
0	1.	Structures that allow fish to breathe under water.	()
0	2.	A gas presents in air and water, and is very important for breathing process. (Behira 2022)	()
0	3.	A gas which the human and fish bodies must get rid of during	
		exhalation process.	()
0	4.	A kind of pollution that is caused due to throwing waste materials	
		into the waterways and soil.	()
0	5.	A kind of pollution that is caused due to the exhausts from cars	
		and some factories.	()
5	C	omplete the following sentences :	
Ī		Humans use to breathe, while fish use to breath	ne
		Trainers as a single state of the single state	.c. (Cairo 2023)
	2	In both human and fish, carries oxygen gas to all the body	
Ĭ		·	
Ĭ	ა.	Gills of fish are considered as adaptation that allow fish to under water.	Direattle
i	4.	Human activities and bad habits can pollute, are of an ecosystem.	nd soil
	5	All living organisms including humans, animals and are a	ffected
	. <b>.</b>	negatively by pollution.	
P	6.	One of air pollutants that makes human hard to breathe is	••
1	7.	When air pollution is very high over a long period of time, it may ca, ,	use
6	G	ive reasons for :	
1	1.	Gills are very important organ for fish.	(Cairo 2023)
þ	2.	Cars and factories exhausts cause breathing problems.	
1			
1			
9	3.	Sometimes people in big cities must change their lifestyle.	

What happens if?		
Human activities and bad habits incre	eases.	
2. The exhausts from cars and factories	increase in big cities.	
3. Water pollution increases. (for human	and fish).	
Look at the opposite figures, then answ	wer the questions :	
1. The death of fish in figure (1) may ha	ppen	Davi -
a. clearing lands. b.	soil pollution.	
c. water pollution. d.	cutting forests.	
2. In your opinion, the smog produced fr	om the factories	Figure (1)
in figure (2) may cause in th	e ecosystem.	L XVIII
a. increasing of air pollution	16	The state of the s
<ul> <li>b. decreasing of air pollution</li> </ul>	*	6 -
c. keeping the lungs of human health	y 🚢	
d. increasing the number of plants an	d animals	Figure (2)
Look at the opposite figure, then comp words below :		•
(oxygen – gills – carbon dioxi	ide – behavioral – structu	ral)
1. Arrow number 1 represents	of fish, which	<b>A</b>
allow it to breathe under water.		
2. Arrow number ② represents water er	nters the	
mouth of fish carrying gas.	3	
3. Arrow number ③ represents water th	at comes out of fish body	carrying
gas.		
<ol> <li>The organ of fish which responsible for adaptation.</li> </ol>	or breathing is considered	as

# **LESSON FIVE**

# **Activity 12** Record Evidence Like A Scientist

- ▶ In this concept, you have learned a lot about how different types of adaptations help plants and animals survive.
- ▶ In this activity, which will be repeated at the end of each concept, we will learn how to think like scientists to answer a question about one of the main points of this concept through four main steps :
  - Step (1): The Question.
- Step (2): My Claim.
- Step (3): My Evidence.
- Step (4): My Scientific Explanation.

# ? Step 1 The Question

How do different types of animals and plants adapt to survive in extreme climate?

# Step 2 My Claim

Animals and plants have the ability to change their bodies structures and behaviors to adapt the extreme climate to survive in their environments.

#### **○** Note

Your claim should be formed of a sentence that gives an answer for the previous question in step 1.

## Step 3 My Evidence

- Examples of structural adaptations :
  - Some animals have thick fur to keep their bodies warm, while some other animals have extra-large ears to keep their bodies cool.
  - Some plants have tiny leaves to hold in water.
- Examples of behavioral adaptations :
  - Some animals stay in burrows to keep their bodies warm or cool.

#### **○** Note

You should mention enough and suitable evidence that support your claim.

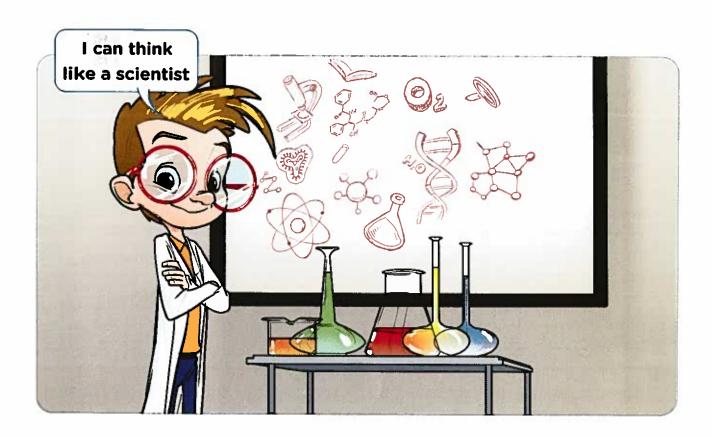
# Step 4 My Scientific Explanation

Animals and plants can survive in extreme climate through structural and behavioral adaptations, where :

- The structural adaptation in the polar bears that have thick fur and penguins that have a layer of fat to adapt the cold climate in polar regions.
- The structural adaptation in fennec foxes that have extra-large ears and also the behavioral adaptation as they stay in burrows to adapt the hot climate in desert regions.
- The structural adaptation in acacia trees that have tiny leaves to hold in water to adapt hot climate in savannah regions.

### Note

Your scientific explanation should explain your claim and evidence introducing some supportive examples from what you have learned.



# Activity 13 S T E M in Action

### Careers and adaptation:

- · Through researches, scientists can learn how different organisms adapt to their environments and help endangered species survive.
- In this activity, we are going to study amphibians which are one of the most amazing living organisms on Earth.

### **Amphibians:**

They are small animals that live on land and in water such as :

Frogs



Toads



Salamanders



- They can live in moist (wet) environments like rainforests, water streams and ponds.
- · Like humans, adult amphibians can breathe using lungs when they are on land, but amphibians can also take in oxygen from water.

#### Structural adaptation of amphibians to live in wet environments:

 Amphibians breathe in (respire) through their lungs and skin to adapt to live on land and in water as follows:



Golden frog

Breathe in through lungs	Breathe in through skin
On land, amphibians inhale oxygen gas from air through their lungs.	The bodies of amphibians are covered with skin that allows water and gases to pass through, so they can absorb (extract) oxygen directly from water.

careers

endangered species الأتواع المهددة بالإنقراض

amphibians وظائف

adult

researches برمائيات

أيحاث

pond بالغ

بركة ماء

الضفدع الذهبى

- Amphibians need clean water and air to stay healthy, because they are very sensitive to the effects of :
  - Water pollution.
- Air pollution.
- Viruses that can travel through water.

#### The role of scientists to protect many types of amphibians from extinction:

- · Scientists (biologists) are working to save many types of amphibians from extinction by studying:
  - How amphibians interact with their environments.
  - Factors which cause air and water pollutions that affect the life of amphibians.
  - What make these animals sick in their environments.

#### How do people help in protection of amphibians from extinction?

- Clean air and water are important for amphibians, so people should:
  - Avoid throwing waste materials in water.
  - Dispose of chemicals in a correct way helps to avoid water pollution.

### Note

Ninety species of amphibians have become extinct in the last 20 years in addition to 124 other endangered species.

## 🌠 Check your understanding

- ▶ Put (√) or (x):
  - Throwing chemicals into the water doesn't affect the life of amphibians. (
  - 2. Amphibians breathe in through their lungs and skin.

#### Review on Concept [1-1]

To review this concept look at the Assessment Book "Part 2 : Final Revision".

#### In the Assessment Book:

Try to answer:

- Self-Assessment (5)
- Model Exam on Concept (1.1)

## **Exercises on Lesson 5**

BIE.		• Understand	O Apply	Higher Thinking Skills
1		hoose the correct answer:		
i	1.	. Amphibians are adapted to		
		a. dry environment	V-1016	ist environment
		c. arctic environment		ndy environment
¢	2	. Starred agama and salama	ander,	
		a. both are reptiles.		
		b. both are amphibians.		
8		c. the first is a reptile, while		
		d. the first is amphibian, w		•
0	3.	· · · · · · · · · · · · · · · · · · ·	nd they don't h	ave lungs and also cannot respire
		through skin, then		
Ì		a. they cannot live outside		
		b. they can live outside wa		
		c. they cannot live under w		
		d. they can live in desert la	•	
i	4	. Amphibians can take in ox	-	
		a. water only. c. food and air.		only. ater and air.
	_			itei ailu aii.
Ĭ	3	. In rainforests, we can find		
		a. panther chameleon and		
		b. amphibians and fennec		
		c. arctic foxes and fennec		
Ţ	6	d. panther chameleon and	•	mos zaro duo to severe changes in it
Ĭ	O	natural habitat, this means	•	mes zero due to severe changes in its cies
1		a. becomes endangered.	b. be	ecomes extinct.
		c. will survive.	d. go	ing to be extinct.
•	7	. Both humans and amphil sentences is correct?		in oxygen. Which of the following
		a. Both can breathe in oxy	ygen gas throu	igh lungs.
		b. Both can take in oxyge		
		c. Humans can breathe in		

d. Amphibians can breathe in oxygen gas through gills.

	8. Blood vessels that carry oxygen gas in amphibians, present in		
	a. skin and digestive system.		
	b. lungs and eyes.		
	c. digestive system and eyes.		
	d. skin and lungs.		
>	9. Amphibians, lizards, trees, birds, fish and humans		
	a. some of them need oxygen gas to respire.		
	b. some of them need carbon dioxide gas to respire.		
	c. all of them need oxygen gas to respire.		
	d. all of them need carbon dioxide gas to respire.		
)	10. If a pond where some frogs live is highly polluted with wastes and viruses What you have to do to preserve these frogs?	•	
	a. Fill in the pond with sand.		
	b. Dry this pond from water.		
	c. Supply this pond with more oxygen gas.		
	d. Remove the pollutants from water.		
	Put (\(\nabla\)) or (\(\lambda\):		_
	1. Amphibians include frogs and salamanders. (Alex. 2023)	(	)
	2. The natural habitat of amphibians is rainforest, while that of panther		
	chameleon is desert.	(	)
	3. The number of amphibians increases in the last few years, due to		
	restoring of its ecosystem.	(	)
	4. Arctic foxes and amphibians cannot be found in the same habitat.	(	)
	5. Salamanders and fish can breathe in air through lungs.	(	)
	6. In the habitat of amphibians, we can find some types of reptiles.	(	)
	7. Scientists try to save golden frogs from extinction.	(	)
	8. Clean water and air are very important for respiration process in		
	amphibians.	<b>,</b>	)
	9. It is important to advice people not to throw waste materials in waterways to save amphibians' life.	,	)

3	W	rite the scientific term of each of the following:	
	1.	Species that include frogs, toads and salamanders.	()
	2.	The organ through which salamanders can take in oxygen gas direct	ctly
		from water.	()
	3.	Species of living organisms that can live on land and in water.	
		(Alex. 2024)	()
•	4.	The type of adaptation that allows frog to take in oxygen gas from	
		water directly through the skin.	()
þ	5.	A respiratory organ that contains little air sacs, and found in human	S
		and frogs but not in fish.	()
4	C	omplete the following sentences :	
9	1.	Starred agama lizard is a, while frog is an	
	2.	Humans, amphibians and reptiles have to breathe in oxygfrom air.	gen gas
	3.	Bull shark can respire through only, while salamander ca through and	n respire
	4.	Both humans and adult amphibians have no that is preserved that is preserved.	ent in fish for
	5.	As the pollution rate of water in ponds and air increases, the numb amphibians	er of
•	6.	Amphibians have two ways to breathe in oxygen, one from air throand the other from water through	ugh
-	7.	The ability of amphibians to take in oxygen gas from water through	n the skin, is
		considered as adaptation.	(Giza 2022)
•	8.	All living organisms breathe in oxygen gas and gives out product.	as a waste
•	9.	Pollution ofand may cause a big problem on tamphibians survival.	he
E	30	orrect the underlined words :	
	1.	Fish can breathe only in <u>air</u> .	()
	2	Amphibians live in dry environments.	()
	3.	. Starred agama is a reptile, while frog is a lizard.	()
	4.	. Amphibians have gills as well as humans for respiration.	()

I	5. Amphibians can take in carbon dioxide gas from air for respiration.	()
١	6. In rainforests, we can find panther chameleon and arctic fox.	()
l	7. Reptiles have two different ways for breathing.	()
	8. Humans and frogs can breathe in oxygen gas in water.	()
9	Give reasons for :	
١	1. Skin of fish is different from that of frog, although both of them live in	n water.
	2. Dry seasons is very harmful for amphibians.	
1	3. Pollution of air and water can affect the survival of amphibians.	
	4. Scientists must study how amphibians interact with their environme	nts.
		•••••••••••
7	What happens if?	3
	Pollution level increases in the natural habitat of amphibians.	
	The ecosystem of amphibians is containing clean air and water.	•••••••••••••••••••••••••••••••••••••••
	3. Amphibians don't have lungs and breathe only through skin.	•••••••••••••••••••••••••••••••••••••••
	4. The number of predators of amphibians increases.	
	5. Salamanders have lungs only to respire.	
	6. Skin of frogs becomes dry.	

## Model 1 Exam

## On Concept [1.1]



1 (A) Choose the correct answer :	(5 marks)			
1. Both golden frog and polar bear,				
<u> </u>	b. can breathe in oxygen gas in water.			
c. have the same body coat.	d. are living organisms.			
2. The color of the body coat of arctic fox changes according to the season, this is considered as				
a. change of the way of breathing.	b. a type of structural adaptation.			
c. change of the way of drinking.	d. a type of behavioral adaptation.			
3. In dry desert, most plants need	to get water from the sandy soil.			
a. long trunk	b. long roots			
c. long branches	d. long leaves			
4. The food moves into the stomach	through the			
a. esophagus.	b. trachea.			
c. small intestine.	d. tongue.			
(B) Give a reason for the following:	:			
Gills are unique structural adaptation in fish.				
2 (A) Put (\(\sigma\) or (\(X\):	(5 marks)			
Both salamander and fish can bre				
<ol><li>In polar environment, the sandy-c snow.</li></ol>	olored fur of caracal helps it blend in with  ( )			
3. Panther chameleon and agama li	zard can use one of their eyes for searching			
for food and the other one to look				
<ol><li>Adaptation to store water is an im in dry desert environment.</li></ol>	portant characteristic for plants that live			
_	,			
(B) What happens if?  The diaphragm moves upward d				
	uring exhalation.			
	uring exhalation.			

3	(A) Correct the underlined words:	(5 marks)
	1. Amphibians live in dry environments.	()
	2. Reptiles like toads have two different ways for breathing.	()
	3. Fish use gills to extract carbon dioxide gas from the water.	()
	4. Mangrove tree has wide leaves to absorb a large amount of sunlight.	()
	(B) Give only one example of behavioral adaptation in bull shark.	

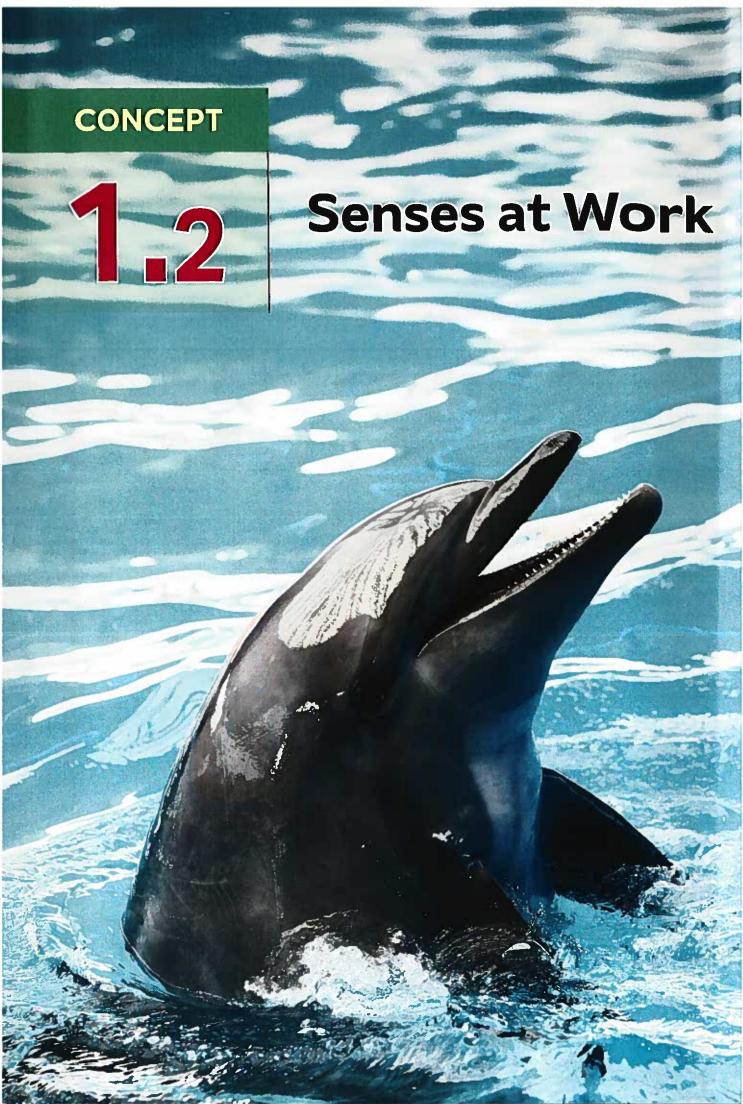
## Model 2 Exam 2

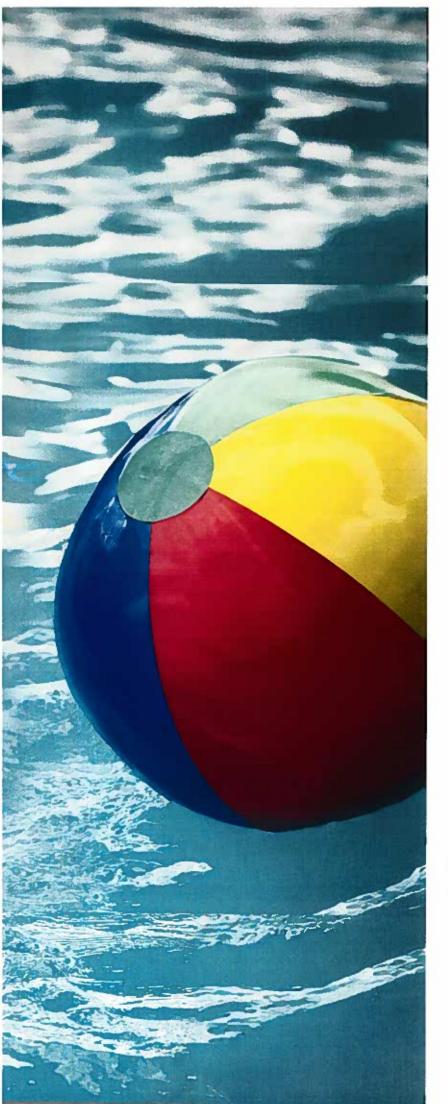
## On Concept [1.1]



1	(A) Write the scientific term of each of the following:		(	5 marks)
	1. It covers the body of some types of bears to keep the	eir bodies wa	rm	
	and to blend in with snow.		(	)
	2. A feature in bull shark, in which the lower surface of	its body		
	is lighter than its upper surface.		•	)
	3. A plant lives in salt water environment and it has long	g roots to resi		
	water waves.		`	)
	4. An organ through which solid wastes of digestion lea	eve the body.	(	)
	(B) Cross out the odd word:			
	1. Penguin – Acacia tree – Pine tree – Polar bear.		(	)
	2. Panther chameleon – Fennec fox – Bull shark – Aga	ma lizard.	(	)
2	<ul> <li>(A) Choose the correct answer:</li> <li>1. The stomach has an acid that helps in</li></ul>			(5 marks)
	<ul> <li>2. Water lily has wide floating leaves to</li> <li>a. prevent the loss of water.</li> <li>b. resist the water.</li> <li>c. absorb a large amount of sunlight.</li> <li>d. absorb a large amount of water.</li> </ul>	er waves.		
	<ul> <li>3. All of the following living organisms live in desert, ex</li> <li>a. palm tree.</li> <li>b. pine tree.</li> <li>c. starred agama lizard.</li> <li>d. fennec fox.</li> </ul>	cept	<b></b>	
	<ol> <li>Amphibians absorb oxygen directly from water by the a. skin.</li> <li>b. gills.</li> <li>c. lungs.</li> </ol>	neir d. nose.		
	<ul><li>(B) Correct the underlined words:</li><li>1. Gills are unique behavioral adaptation that allow fish under water.</li></ul>	h to breathe	(	)

2. Small intestine is a long muscular tube that moves food down into	
the stomach.	()
(A) Look at the opposite figures, then answer the questions below	OW: (5 marks)
(1) Which figure represents inhalation ? ()	
(2) Which figure represents exhalation ? ()	
(3) In figure (a), muscle contracts and the size of chest	
(4) In figure (b), the air that comes out is rich in gas .	
Figure (a)	Figure (b)
(B) Give a reason for the following:	
The human body is made up of different systems.	





### Learning outcomes

By the end of this concept, your child will be able to:

- Develop models that show how animals receive, process and react to information in their environments.
- Explain how organs and systems work together to process and respond to input from the senses.
- Plan and carry out investigations to produce evidence that the senses play a role in reaction time.
- Argue, using evidence, that sound allow to the transfer of information through systems of communication.
- Compare innovative human designs to systems of communication in the natural world.

### Key vocabulary

• Brain

• Receptor

Response

Senses

Sound

Information

Nerve

iiiioiiiiatioii

- IACI A

• Echolocation

• Echo

• React

System of communication

## Notes For Parents

## On Concept [1.2]

Lessons	Activities	What you should do with your child
	Activity 1	Explain to your child how humans and animals gather information from the environment by using their senses.
1	Activity 2	Discuss with your child how dolphins use the sense of "echolocation" to locate their preys and other objects under water.
	Activity 3	Discuss with your child that animals can use more than one sense for one purpose.
	Activity 4	Discuss with your child how some nocturnal animals use their super senses to hunt their preys in the dark during the nighttime.
2	Activity 5	Explain to your child the structure of the nervous system and how it works.
	Activity 6	<ul> <li>Discuss with your child the difference between humans and animals in avoiding danger.</li> <li>Explain to your child how the nervous system of "jerboa" helps it to avoid danger.</li> </ul>
	Activity 7	Discuss with your child the different functions of the nervous system.
3	Activity 8	Let your child answer some questions about the nervous system and its functions to check his/her understanding.
	Activity 9	<ul><li>Explain to your child how ants communicate with each other.</li><li>Discuss with your child the way of communication that humpback whales use.</li></ul>
4	Activity 10	Let your child know the similarities and differences between the special cane of the blind person and the bat echolocation property.

## LESSON ONE

## Activity 1 Can You Explain?



# Can you notice how the above living organisms receive information from their surrounding environments and how they are responding to them?

- Humans have ears which are the organs of hearing to listen to music.
- Owls have extraordinary senses of hearing and sight to be able to find their preys in the dark.
- Oogs have very sharp senses of hearing and smell, which are used in guarding.
- The Egyptian mongoose makes sounds to communicate with other mongooses to move from one place to another or when searching for food.
- From the previous explanation we conclude that :

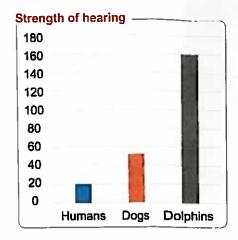
Animals have senses like humans that enable them to communicate with each other and adapt to their surrounding environments.

- In this concept, we will study :
  - Dolphin senses.
  - Super senses of some animals.
  - The nervous system and how it works.
  - Songs of whales.

- How the five senses work.
- Communication systems.

## **Activity 2 Dolphin Senses**

- ▶ Look at the opposite graph, then put (√) or (x):
  Living organisms in the graph have similar hearing senses.
  ( )
- Dolphins have sharp senses (super senses) that help them survive through:
  - Finding food.
  - Protecting themselves under water.
- The most sharp sense that dolphins have is the sense of hearing, since they can hear all kinds of sound.



### How can dolphins locate organisms and other things under water?

Dolphins use a property known as "echolocation" that depends on **"echo"** to determine the location of other living organisms and objects in the water.

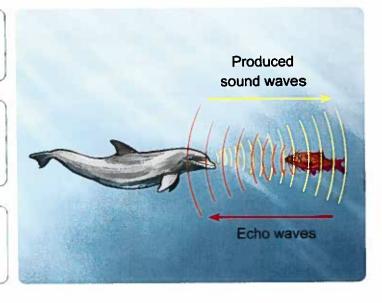
**Echo** is the bouncing back of sound waves when they hit a solid surface.

▶ Let's see how dolphin use the property of echolocation :

Dolphin produces sound waves that travel through water.

These waves hit objects then bounce back to the dolphin in the form of echo.

Echo helps the dolphin to locate its prey and other objects.





### Check your understanding

▶ Put (√) or (x):

1. Smell is one of the most sharp senses of dolphins.

2. Echo helps dolphins locate their preys.

(

### Activity 3

## What Do You Already Know About Senses at Work?

#### Animal perceptions:

- You have known that animals have senses like those of humans.
- Each animal can use more than one sense for more than one purpose to adapt to its habitat, as shown in the following examples :

	Animal	Senses	The purpose
Fox		Hearing and sight	Avoiding danger
Chameleon		Sight and taste	Finding food
Dog		Smell and sight	Recognizing friends
Monkey		Touch, smell, sight, taste and hearing	Identifying objects

## Check your understanding

### ▶ Put (√) or (x):

- 1. The owl can search for food using its sight sense. (
- ) In the Assessment Book:
- 2. The cat can avoid danger using its taste sense.
- Try to answer:
  Self-Assessment 6

purpose

## **Exercises on Lesson 1**

 Higher Thinking Skills Apply Understand 1 Choose the correct answer: 1. To know if a cup of water is hot or cold, we need to use the sense of ......... d. touch. c. smell. b. hearing. a. sight. 2. We can distinguish between water and milk through ........ b. sight and hearing. a. taste and hearing. d. taste and sight. c. smell and hearing. 3. The sharp senses of a dolphin help it do all of the following, except ......... b. finding food. a. surviving. d. protecting itself under water. c. finding water. 4. If there is some salt in a dish and some sugar in another dish, you can distinguish between them through the sense of ......... d. hearing. c. touch. b. taste. a. smell. 5. The five senses of humans and animals are ......... a. sight, hearing, touch, smell, and movement. b. sight, movement, taste, touch, and smell. c. taste, touch, movement, hearing, and smell. d. sight, hearing, taste, smell, and touch. 6. Echo helps bats and dolphins to locate ....... of their preys. b. the color a. the location d. the taste c. the smell 7. Dolphins depend on their sharp sense of ...... to get food. (Damietta 2024) d. hearing c. smell a. sight b. taste 2 Put (\(\sigma\)) or (\(X\): 1. A human can identify music through ears which are the organs of sight. ) 2. The Egyptian mongoose can communicate with its species by making ) sounds. 3. The sense of hearing of dolphins is stronger than that of human. 4. We use our sense of smell to identify the color of a flower. 5. Skin helps human distinguish between the taste of different types of food through the sense of touch.

6. Chameleon uses its tongue to taste food.

7. Foxes have sharp sense of taste to avoid dangers.

8. Dolphins depend on countershading property to find its food.

	<b>3</b> Write the scientific term of each of the following:	
•	1. The property that depends on the sense of hearing through which	h dolphins
١.	locate their preys under water.	()
	2. The organ used to recognize different colors.	()
	3. The organ used to recognize different odors.	()
- 1	4. The sense used to differentiate between smooth and rough surfa	•
	5. The return back of sound waves on hitting a solid surface.	()
4	4 Complete the following sentences :	
	1. The dog uses the senses of and in guarding.	
0	2. A human can pay attention to an alarm bell in case of danger throaf	ough the sense
	3. Dolphins have sharp sense of, which they use to locate organisms under water through the property.	living
C	4. We can identify the odor of flowers using the sense.	
d	🖕 5. Echo is the bouncing off waves when they hit a solid sur	face.
Ė	5 Correct the underlined words :	
•	1. The dolphin has sharp sense of touch.	/
	2. The dog uses its eyes to recognize odor of humans.	() ()
	3. The fox uses its tail and ears to run away when it sees or hears	()
	its enemies.	()
ľ	4. Dolphins use camouflage property by using sound waves to hunt	
		()
6	Give reasons for :	
	1. The Egyptian mongoose make sounds.	
-	2. Owls can hunt during the night.	
-	3. Dogs are used in guarding.	
-	4. Dolphins can hear all kinds of sound.	(Cairo 2023)
7	What happens to?	
-	The sound waves produced by a dolphin when they hit an object un	der water.
1		

_	trate how dolphins use their sharp hearing	
to catch preys :		
1	d hit the prey, then bounce back to the	
dolphin in the form of an echo.		
() The echo helps the dolphin locate its prey.		
() The sound produced by a dolphin is transmitted in the form of waves		
called sound waves.		
Look at the following pictures, then	choose the correct answer:	
Animal (1)	Animal (2)	
1. The sharpest senses that animal	(1) has are	
a. touch and smell.	b. smell and hearing.	
c. taste and sight.	d. hearing and taste.	
2. Animal (1) uses one or both of its	sharpest senses in each of the following	
situations, except		
a. identifying friends.	b. identifying food.	
c. recognizing strangers.	d. tasting food.	
3. The sharpest sense that animal (	2) has is	
a. hearing.	b. <b>taste.</b>	
c. touch.	d. <b>smell.</b>	
4. Animal (2) uses its super sense it	n each of the following situations, except	
a. locating objects under water.		
b. avoiding danger.		
c. detecting scents of living organ	nisms under water.	

d. locating preys under water.

## **LESSON TWO**

### **Activity 4** Sensory Organs of Nocturnal Animals

▶ Look at the following pictures, then put (√) or (x):



Human can see everything clearly inside a dark room.



- 2 An owl can see its prey in the dark during nighttime.
- You can hear the noise of something moving through the darkness, even you cannot see it clearly.
- Some animals known as "Nocturnal animals" look for their food at night using their sharp senses.

#### Nocturnal animals:

They are animals that become more active at night to look for their food.

- Why do some animals become active at night?
  - 1. In extremely hot places, the best time to look for food is nighttime, when it is cooler.
  - 2. Some animals hunt preys which are available only at night.
  - 3. Some animals depend on darkness to hide from their preys and surprise them.
- ► How can nocturnal animals hunt without much available light?

Super sensory adaptations of nocturnal animals allow them to navigate (move) safely and find food in the dark, as shown in the following examples:

#### 1. Bats:

- Bats depend on echolocation to find their food.

#### Purpose:

To help bats move around and find its food (preys such as insects) at night.



#### **Notes**

- 1. Both bats and dolphins use echolocation to find their food.
- 2. Unlike dolphins, bats are nocturnal animals that can hunt at night.

#### 2. Owls :

- Owls have very sharp sight and hearing senses.
- \* Owl's face:

It has a bowl-shaped face with special type of feathers in its head. **G.R.** 

- To direct distant sounds into the owl's ears.
- \* Owls' large eyes :

Its eyes allow the owl to see tiny and far-away movements of their preys.

\* Owl's head:

Its head has the ability to turn in all directions. G.R.

- To search for preys everywhere.

### Purpose:

To detect the movements and sounds of tiny distant preys.



### 3

### **Check** your understanding

- Choose the correct answer:
  - 1. The senses of \_\_\_\_ are from the very sharp senses in owls.
    - a. hearing and smell
- b. sight and smell
- c sight and hearing
- 2. Which of the following animals are not a nocturnal animal?
  - a. Bat.

- b. Dolphin.
- c. Owl.

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## Activity 5 The Nervous System

- Senses work together with the nervous system to gather information from the environment.
- Mammals such as humans, elephants and dogs have the same structure of nervous system.

### The nervous system consists of:

- The brain.
- The spinal cord.
- Nerves.



It is connected to the spinal cord.

#### Its function:

It is the main control center in the body.

#### The spinal cord

- It consists of many nerves that are collected together and run through the backbone.
- It is branched into smaller and smaller nerves.

#### Its function:

It carries messages from the brain to the body parts and vice versa.

#### **Nerves**

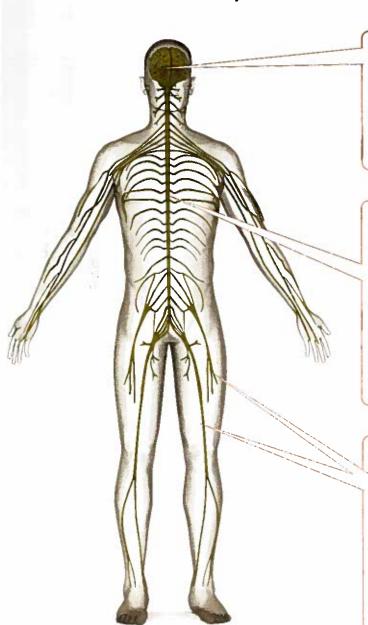
Nerves are distributed throughout the body and connect the sense organs and the body parts with the brain.

#### Their function:

They carry messages from the brain to the spinal cord and other parts of the body and vice versa.

#### Note:

Some nerves are connected directly to the brain such as the nerves of eyes and heart.



Human nervous system

#### **Notes**

- 1. The nerves transmit information from the sensory organs (nose ears eyes tongue skin) to the brain.
- 2. The five sensory organs contain a special type of nerves known as sensory receptors.

#### Sensory receptors:

They are nerves found in sensory organs that are responsible for receiving information from the environment.

- How does the nervous system work if you smell pizza?
  - 1. The sense organ (nose) receives the information from the environment which is the pizza's odor.
  - 2. Then the sensory receptors of smell that are found in the back of your nose send specific signals along the nerves to your brain.



3. Once the information about the smell reaches your brain, the brain processes that information and determines the type of the food.

### Check your understanding

Using the words bellow to complete the following sentences:

( nerves - processes - sensory receptors )



transfer through



send specific signals to



Nose

Nerves

Brain

Receive information

Transferring

Processing

- 1. The nose contains that receive the odour of the food.
- 2. The odour transfers to the brain through ......
- 3. The brain ...... these information and determine the type of the food.

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## **Activity 6 Sensing the Environment**

▶ In this activity, we will learn how structural adaptations and the nervous system work together to help the jerboa survive.

### Jumping jerboa:

- The Egyptian jerboa is a desert rodent.
- It searches for food at night.
- Jerboa adaptations to the environment :

Jerboa has large and sensitive ears, so it can detect even a quiet snake. (Structural adaptation)



 It hops in zigzag patterns, so it can escape quickly from danger.

(Behavioral adaptation)



Egyptian Jerboa

Jerboa has long hind legs that enable it to jump a long distance. (Structural adaptation)

How do all parts of a jerboa's body work together to avoid danger?

When a snake makes noise as it comes near a jerboa to hunt it:

The sensory receptors in the jerboa's ears send a message through a network of nerves to its brain.

The jerboa's brain translates this message and alerts its legs to move.

The jerboa's strong hopping legs start to jump away from the danger (the snake) in zigzag paths.

#### Unit 1 | Concept 2

- The jerboa's sharp sense of hearing and its strong legs for jumping work together with its nervous system to help it survive.
- The whole response process of the jerboa running away from danger occurs in less than one second.
- The time taken by a jerboa to react to danger is known as the "reaction time".

#### Reaction time:

It is the time taken by the body of a living organism to respond and react to different information from the environment (such as danger).

- How does the jerboa respond to danger compared to a human ?
  - Both human and jerboa avoid danger by relying on sensory receptors, nerves and a brain to sense and communicate messages.
  - Both human and jerboa move quickly away from danger for their safety.

#### **Examples:**



- Jerboa hops in zigzag patterns, so it can escape quickly from danger.



 Human moves quickly his hand away, when it touches the spines of a cactus plant.

## JS

### Check your understanding

### ▶ Put (√) or (x):

- When a jerboa feels unsafe, its brain sends messages to its legs through its nervous system to run away from danger.
- 2. The reaction time is the time taken by a jerboa to respond to danger. ( )
- 3. Jerboa's hind legs are short to help it jump long distances. ( )

In the Assessment Book:
Try to answer:
Self-Assessment (7)

## **Exercises on Lesson 2**

Understand Apply Higher Thinking Skills Choose the correct answer: 1. The senses you depend on to find a small radio that produces low sound in a dark room are ...... a. hearing and smell. b. touch and taste. c. smell and taste. d. hearing and touch. 2. The responsible system for moving your hand away from danger, such as touching a hot cup of tea, is the ...... system. a. digestive b. respiratory c. nervous d. urinary 3. When snakes make a noise, the sensory receptors found in jerboa's ...... send a warning message to the brain. b. nose a. ears c. feet d. teeth 4. The brain is the main control center in the body, so it can deal with ..... at the same time. a. two senses only b. three senses only d. all the five senses c. four senses only 5. Animals that become active at night are called .......... (Cairo 2023 / Gharbia 2022) a. diurnal animals. b. nocturnal animals. c. extinct animals. d. endangered animals. 6. When your hand touches the spines of a cactus plant, it is withdrawn in ......... a. less than one second. b. one minute. c. two minutes. d. one hour. 7. When a jerboa hears the sound of a moving snake, it ......... a. remains standing in its place. b. jumps to hunt the snake. c. makes sounds to frighten the snake. d. jumps quickly to run away from the snake. 8. The organ that processes the information collected through the sense of sight is ..... a. the spinal cord. b. nerves. c. the brain. d. eyes. 9. The nervous system of mammals consists of ...... (Cairo 2022) a. the brain only. b. the spinal cord only. c. nerves and the spinal cord only.

d. the brain, the spinal cord and nerves.

10	Both the spinal cord and nerves				
	a. are located in the brain.				
	b. are located in the small intestine				
	c. transmit messages from the brai		no voroe		
	d. transmit messages from the braining				
11	Which of the following choices exp food in the correct order?	plains how the body reacts to the	e smell of		
	a. Brain — nose — nerves.	b. Nose ——→ brain ——→ nerv	es.		
	c. Nerves — brain — nose.	d. Nose ——→ nerves ——→ bra	ain.		
12	. The correct order for a bat to locat	te a mosquito using echo, is			
	a. mosquito makes a sound re	eaches the bat —— returns to m	osquito.		
	b. bat makes a sound —— reache	es a wall —— <mark>—</mark> returns to mosqu	iito.		
	c. mosquito makes a sound	reaches a wall ——▶ returns to i	mosquito.		
	d. bat makes a sound ——→ reach	es the mosquito $\longrightarrow$ returns to	bat.		
13	. Owls have all the following proper	ties to sense distant preys that	make low		
	sounds, except		(Menofia 2022		
	a. large eyes.				
	b. a bowl-shaped face.				
	c. a head that turns in all directions	s.			
	d. weak sense of hearing.				
14	. The owl's large eyes and bowl-sha	aped face are considered as	adaptation		
	a. only structural				
	b. only behavioural				
	c. both structural and behavioral				
	d. neither structural nor behaviora	I			
15	. Flying bats don't hit different object	cts at night because they can	•••••		
	a. see them clearly in darkness.	b. touch them.			
	c. smell them.	d. hear the echo reflected fror	n them.		
16	. Some animals become active duri	ing the night due to the following	reasons,		
	except that				
	a. the night is characterized by the cool weather.				
	b. the night is a good time for rela	xation and rest.			
	c. the night is quiet, so that they c	an hear preys.			
	d. the night is a time when preys a				
17	. Both bats and mosquitoes are ac	tive during night. Which of the fo	ollowing		
	statements is correct ?	5 5	_		
	a. Both can swim well.	b. Both can run fast.			
	c. Bats prey on mosquitoes.	d. Mosquitoes prey on bats.			

## Choose from column (B) what suits it in column (A):

(1)

(A)	(B)
1. Bat	a. It is a flying nocturnal animal that can hear the quiet movements of rats.
2. Owl	b. It is a desert rodent that has large and sensitive ears. c. It is a non-flying mammal.
3. Jerboa	d. It is a flying nocturnal animal that sound reflects to it after hitting insects.

(2)

(A)	(B)
1. Sensory	a. It is the main control center in the body.
receptors	b. It is the time taken to react to different information.
2. Nerves	c. It is found in the backbone and helps transmit messages between the body and the brain.
3. Brain	d. They are found on the sensory organs and the first to sense the surrounding environment.
4. Spinal cord	e. They receive information from the sensory receptors.
1	2 3 1

### $\mathfrak{F}$ Put ( $\checkmark$ ) or (x):

1. Animals that active during the daytime are called nocturnal animals. (Alex. 2024)	) (	)
2. The Egyptian jerboa lives in forests.	(	)
3. The Egyptian jerboa has large ears which help in sensing the snakes.	(	)
4. The owl depends on echo to determine the location of preys within		
the grass or beneath the snow.	(	)
5. A bat makes sounds that hit insects and then bounce back to it, so		
the bat can locate them.	(	)
6. The body senses and systems work separately when animals run away		
from their enemies.	(	)
7. Some animals have abilities that humans do not have, and these abilities		
are called super sensory adaptations.	(	)
8. The sensory receptors in the eyes receive the sound produced by a radio		
and send it to the brain.	(	)

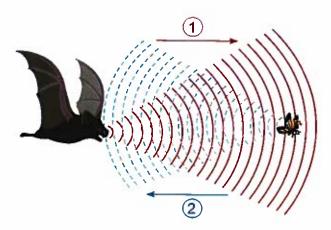
<b>9</b> 9.	The Egyptian jerboa can jump for long distances depending on its long		
	hind legs. (Kafr El-Sheikh 2022)	(	)
   10.	Hopping of the jerboa in zigzag patterns to run away from danger is		
	considered as a structural adaptation.	(	)
11.	The spinal cord is the main control center of the body, which helps carry messages from and to the brain.	(	)
12.	The heart and eyes are connected to the brain through blood vessels that transmit information in the form of specific signals.	(	)
†13.	The large ears of jerboa is an example of structural adaptation.	(	)
<mark>-</mark> 14.	The habitat of the jerboa is similar to that of the polar bear.	(	)
15.	The tongue is the sensory organ responsible for taste, which sends messato the brain to be processed, then identifying the food type.	ages (	)
4 W	rite the scientific term of each of the following:		
<mark>•</mark> 1.	A group of different animals that look for their preys at night. (	••••	)
<b>†</b> 2.	A desert rodent with a small body, large ears and long hind legs. (	•••••	)
3.	A property by which a bat can locate its prey insects through the sound reflected from them. (	•••••	)
4.	An animal that can turn its head backwards, and has a bowl-shaped face and large eyes.  (Giza 2022/Cairo 2023) (	•••••	)
<b>†</b> 5.	A system which composed of brain, spinal cord and nerves.		
	(Cairo 2022) <b>(</b>	•••••	)
<b>†</b> 6.	The organ responsible for processing information transmitted to it. (	•••••	)
<b>•</b> 7.	Many nerves that are collected together and located in the backbone, and	ser	ıd
	messages from and to the brain. (		)
<b>†</b> 8.	Organs include the eyes, nose, ears, tongue and skin, and they receive		
	information from the surroundings and send it to the brain. (	•••••	)
9.	A type of nerves in the sensory organs that is responsible for receiving information from the environment. (	•••••	)
<del>-</del> 10.	. The time taken by an organism's body to respond to different		
	reactions. (Sharkia 2022/Luxor 2023) (		)
5 C	omplete the following sentences :		
	Echolocation is used by some animals such as and		
	The brain is connected to the which consists of many nerves that a	ıre	
	collected together and pass through the backbone.		

3	<ol><li>Hopping of the Egyptian jerboa in zigzag patterns is c adaptation.</li></ol>	onsidered as a
4	<ol><li>Owls can detect the places of their preys by using the and</li></ol>	sharp senses of(Cairo 2023)
5		,
Ö	5. An owl can see everywhere by turning its in all	
	a chameleon can see everywhere by moving its	
	6. The presence of hair on a jerboa's feet and toes is a .	·
' /	<ol> <li>If you see a cat, you have received this information the receptors in your, then the nerves send a signal</li> </ol>	-
8	<ol><li>The Egyptian jerboa and the fennec fox have an exce where both of them have large</li></ol>	ellent sense of,
9	9. The Egyptian jerboa has long to help it jump has hair on its feet and toes to help it	for long distances, and it
10	<ol> <li>When hearing an alarm ring, the sensory receptors the send a message through a network of nerves to the.</li> <li>what to do to avoid danger.</li> </ol>	
11	<ol> <li>When the Egyptian jerboa is in danger, it starts to run in a very short time called the</li> </ol>	away, this action occurs
	Correct the underlined words :	
1	1. The <u>digestive</u> system delivers messages through a ne	etwork of
	nerves around all body parts.	()
2	2. The long hind legs of jerboa are considered as behave	rioral adaptation.
		(Damitta 2022) <b>()</b>
3	3. The spinal cord passes through the mouth.	()
4	<ol> <li>The organ that is responsible for receiving, processin information is the <u>heart</u>.</li> </ol>	g and responding to ()
5	5. A jerboa's feet and toes are covered with <u>feathers</u> .	()
6	6. The sense of sight of owls is <u>weaker</u> than that in bats	()
7	7. When your hand touches the spines of cactus plant,	
	away <u>slowly</u> .	()
8	8. Tongue is the sensory organ that is responsible for $\underline{\mathbf{sr}}$	<del></del>
		()
9	9. When a bat sends a sound against a wall, it returns to	o it this phenomenon

7		ive reasons for :	
i	1.	Animals that live in hot regions become active at night.	
	2.	Owls have bowl-shaped faces.	•••••••••••••••••••••••••••••••••••••••
•	3.		(Sharkia 2023 <sub>)</sub>
	4.	Owl is a nocturnal animal.	•••••••••••••••••••••••••••••••••••••••
	5.	The Egyptian jerboa can jump for long distances.	••••••••••••••••••
0	6.	The presence of hair on the Egyptian jerboa's feet and toes.	
0	7.	The Egyptian jerboa's ears play a very important role in its survival.	
8	W	/hat happens if?	
-	1.	Bats lose the ability to hear by using echolocation property.	
	2.	Owls cannot turn their heads in all directions.	
	3.	Your hand touches the spines of a barbary fig plant.	•••••••
	4.	The Egyptian jerboa hears a snake moves towards it.	••••••••••••
9	130	rrange the following sentences according to how the body parts oerboa act to avoid danger:	f Egyptian
ŀ	(	) The brain alerts the jerboa's legs to start moving.	
	(	) The brain processes the message telling there is a danger.	
	(	) A jerboa hears a snake moving towards it.	
	(	) The jerboa jumps in zigzag paths to run away from the dang	er.
	(	) The sensory receptors that found in jerboa's ears send a mes	sage to

1	Look at the opposite figure, then answer the questions belo	ow:
	a. What does the figure represent ?	
		2
	b. Label the figure :	3
	① ③ ③	X
	c. Complete :	The state of the s
	Number () is found inside the backbone of the human hady.	
	the human body.	
0.00	Number () represents the main control center in the human body.	
	3 Number / \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	

## Look at the following figure, then answer the questions below:



1. Bat is from animals, as it becomes more active at night.	
2. Arrow number represents the sound waves which are produced I	by bat
3. Arrow number represents the echo waves which are returned bathe baths ears.	-
4. This property is called	
5. Mention another animal depending on this property for hunting.	
6. The super sense of hearing for animals is considered as adaptati	on.

## LESSON THREE

## **Activity 7 How the Nervous System Works**

### ▶ Choose the correct answer from those between brackets :

- 1. The nervous system gathers information about what is going on inside and outside the body and sends this information to the ...... (blood vessels - brain)
- 2. The nervous system is connected by ...... that transmit messages (muscles - nerves) around the body.

### **Functions of the nervous system:**

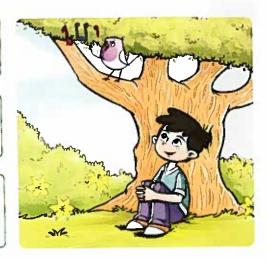
- 1. It gathers information through the sensory organs like the eyes, ears and skin.
- 2. It makes sense of (translates) these information through the brain.
- 3. It tells the body what to do according to these information.

#### Example:

When the ears pick up sound waves coming from a chirping bird.

The nerves in the ears send a message to the brain, which translates these sound waves.

Then, the brain sends a message to the body about what to do, such as turn to look for the bird on a tree.



### Notes

- 1. Some messages, called "reflexes", are so fast that you cannot realize it such as moving your hand away when touching a very hot cup of tea.
- 2. Other messages are sent from and to the brain automatically, like the signal to breathe.

## 🌠 Check your understanding

- Complete the following sentences:
  - 1. The nervous system sends information through \_\_\_\_\_ to the \_\_\_\_\_ to be processed.
  - 2. Collecting information about what happens inside and outside the body is one of the functions of the ...... system.

### **Activity 8** Describing the Nervous System

- From the previous activity, we conclude that :
  - The parts of the nervous system work together to:
    - Sense the environment by sensory organs (such as eyes, nose, tongue ... etc.).
    - Send the information to the brain through nerves.
    - Process these information to decide the best action by brain.
    - Send messages to the body parts by nerves to react to these information.
  - Without all of the parts of the nervous system, the person might not receive, send or react to the information.

## Check your understanding

▶ Read the sentences that describe the nervous system, then write the correct term from the word bank in each blank:

brain – reflexes – sensory organs – nerves – spinal cord – sensory receptors – nervous

1. The is like the command center for your body		
TO THE IS INCOME. COMMENT OF THE VALLE AND IN	ter for your h	r your hady

- 2. Many nerves that are collected together and pass through the backbone are called the
- 3. Messages are carried by ..... to and from the brain.
- 4. Messages sent by the nervous system that are often so fast that you do not think about them are called ......
- 5. The \_\_\_\_\_ are the nerves that lie in different places of the body and are responsible for receiving information from the environment.
- 6. The brain is part of the ..... system.
- 7. The five organs which receive the information from the environment are called ......

In the Assessment Book:

Try to answer:

Self-Assessment (8)

process يعالج receive يعالج command

## **Exercises on Lesson 3**

		<ul> <li>Understand</li> </ul>	<ul><li>Apply</li></ul>	Higher Thinking Skills
-		noose the correct answer :		
ľ				and an annual recentors in the
i	1.		_	nds on sensory receptors in the c. ears. d. skin.
	_	a. eyes. b. nose.		
Î	2.			depends on the senses of
l		a. hearing and sight.		b. sight and smell. d. hearing and taste.
	_	c. hearing and touch.		_
Ï	<b>3</b> .	represents	ien su	ong light rays fall on them suddenly
		a. inhalation.		b. reflex.
		c. countershading.		d. camouflage.
0	4	——————————————————————————————————————		ation from the environment through and
۱	••	then process them by		
١		a. brain – nerves.		b. nerves – sensory organs.
		c. sensory organs - brain.		d. spinal cord – brain.
ŀ	5.	You opened the door of your	r house	when you heard the doorbell. Which of the
		following statements explain	s the s	equence of messages inside your body in
		this situation?		
Ì				b. Ears — hand — brain.
				d. Brain — hand — ears.
i	6.			your team. Which of the following
1			luence	of messages inside your body in this
		situation?	rain	b. Nerves —→ brain —→ feet.
1		c. Nerves — feet — b		
	7			burning nearby, then you realized you had
	•			t there is an integration between the ir
		this situation.		(Alex. 202)
		a. digestive system and resp	piratory	y system
		b. digestive system and ner	vous sy	ystem
		c. respiratory system and ne		-
		d. nervous system and urina		
0	8.	<del>-</del>	e impoi	rtance of the nervous system in mammals,
1		except		
		a. gathering information.		le
		b. pushing blood through blood sanding signals to the bo		
		<ul><li>c. sending signals to the bo</li><li>d. translating information.</li></ul>	uy part	s to react.
,		w dansading implifiation.		

2	Put (✓) or (X):		
÷	1. The brain sends automatic signals so that we can breathe.	(	)
•	2. Blinking when something becomes near to your eyes is an example		•
	of reflexes.	(	)
•	3. Parts of the nervous system work together to gather and process infor	mation,	
	then send signals.	(	)
Ť	4. The nerves of your fingers send signals to the brain to distinguish between	veen	
	smooth and rough objects.	(	)
Ī	5. Sensory organs are responsible for processing information.	(	)
Ĩ	6. The function of the digestive system is distinguishing between hot and	cold	
	things.  7 The perves inside the body connect all parts of the perveys system together.	hor (	)
Ĭ	7. The nerves inside the body connect all parts of the nervous system toget	ner. (	)
3	Write the scientific term of each of the following :		
0	1. It delivers messages between the spinal cord and different body organ	ıs.	
		*******	)
0	2. The organs that receive information from the surrounding environment		
	·		)
•	3. The sensory organ that can distinguish between sharp and rough voice		
	•	****************	•
•	4. The organ which translates information to decide the best action.(		•
•	5. They are messages sent by the nervous system that are often so fast	•	
	cannot realize them. (Behira 2024) (	***************************************	)
4	Complete the following sentences:		_
	1. Theis the organ that sends information through nerves to the	brain	
		Alex. 2024	1
	2. The spinal cord consists of many that pass through the	-	_
	human body.	UI LII <del>C</del>	
	The state of the s	voo to ito	
Ī	<ol><li>If you come near your dog, its nose sends a message through the ner  alerting it that you are coming.</li></ol>		
	· ·	(Giza 2024)	
Ĭ	4. When you touch a very hot object, your hand moves away quickly, this		
		(Giza 2022)	)
1	5. When you hear a train horn, in the ears send a message through	ugh	
	a network of nerves to reach the		
•	6. Theis the organ that is responsible for gathering surrounding		
	while theis the organ that is responsible for gathering differen	t odors.	
÷	7. When an owl hears the sound of a prey, sensory receptors in the	send	
	information through nerves to the to be processed.		
- - -	8. When someone cannot hear clearly, this means that he has a problem	in his	
1	sense.		

### 5 Correct the underlined words :

- 1. The <u>muscles</u> in the sensory organs within your body are responsible for receiving information from the surrounding environment. (......)
- 2. When your eyes are closed, you can distinguish between your brother's voice and your friend's voice, depending on your sense of sight. (......)
- 3. The <u>spinal cord</u> is responsible for processing sound waves coming through ears. (......)

### 6 Cross out the odd word:

- 1. Smell Taste Eyes Hearing. (.....)
- 2. Eyes Nose Skin Taste. (.....)
- 3. Spinal cord Lungs Nerves Brain. (Damietta 2024) (......

### **7** Give reasons for :

- Humans can recognize the sounds of different musical instruments.
- 2. The brain has an important function in the nervous system.

### 8 What happens if ...?

- 1. The spinal cord became absent from the components of the nervous system.
- 2. Sensory receptors related to the eyes stopped sending messages to the brain.

### 9 Look at the following figures, then complete the following sentences:



Part (1)



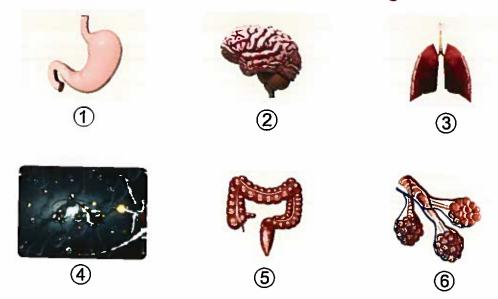
Part (2)



Part (3)

- 1. These body parts belong to the ..... system.
- 2. When you touch a freezing bottle of water, part number ........ in your hand sends a message through part number ....... to reach part number ....... which tells you that this bottle is very cold.

You have some pictures of different parts of the human body. Write down the organ number in front of the system to which it belongs in the following table:



System	Organ
1. Digestive system :	
2. Respiratory system :	
3. Nervous system :	•••••

## 11 Complete the following table:

The organ	Its function
1. The brain	
2	Carry messages from all body parts to the spinal cord then to the brain.
3. The spinal cord	

### LESSON FOUR

### **Activity 9** How Animals Use Communication Systems

#### ▶ Put (√) or (x):

- 1. Humans only can communicate with each other by sounds. ( )
- 2. Some animals produce different sounds to send messages to each other. ( )
- Technology systems allow humans to communicate with each other through:
  - Making phone calls.
  - Sending text messages and e-mails.
- Animals don't use technology systems as we do, but they can still use other systems to communicate with each other.
- We will study ants and humpback whales as examples of these animals.

#### Ants:

- Ants live in colonies that contain thousands of individuals.
- Groups of ants within a colony have different roles, where they have developed systems that help them divide their work among themselves, so there are nurse ants, scout ants and soldier ants.



### How do groups of ants communicate with each other?

When the food is low, nurse ants send smelly messages to scout ants which are responsible for locating food.

The scout ants respond by sending a smelly message to alert the ants where to find the food.

#### 🖓 Note

The soldier ants also use smelly messages to communicate if there is danger nearby.

#### **Humpback whales:**

- Humpback whales sing under water to communicate with each other, where they sing a wide range of notes (tones) and a series of songs.
- The songs of humpback whales have different sounds depending on the season, where:



In winter	In summer
- It is the mating season.	- It is the feeding season.
- Their songs have high-pitched sounds which travel better through cold water.	- Their songs have low-pitched sounds which travel better through warm water.

#### **Notes**

- 1. High-pitched sounds such as the sharp voice of a woman.
- 2. Low-pitched sounds such as the rough voice of a man.

### Check your understanding

- ▶ Complete :
  - 1. When the food is low, \_\_\_\_ ants send \_\_\_\_ to \_\_\_ ants which are responsible for locating food.
  - 2. The \_\_\_\_\_ ants use smelly messages if there is danger nearby.
- ▶ Choose the correct answer :
  - 1. The rough sound of humpback whale is ..... pitched sound.
    - a. high

b. low

- c. soft
- 2. The songs of humpback whales have a ..... pitch in winter.
  - a. higher

b. lower

c. rough

### Activity 10 S T E M in Action

#### **Technology Inspired by Nature**

- ▶ Bats use sound in some purposes such as :
  - Communicating with each other.
  - Getting information about their surroundings using their hearing sense.

## How does the bat use its ears for echolocation to get information about its surroundings in the dark?

The sound hits something nearby the bat and reflects back to it in the form of "echo".

Bat makes a high-pitched sound.



Bat listens for the echo (reflected sound).

So, bat knows that there is something nearby.

#### Bat Inspired technology:

- Scientists have been inspired (get benefited) by the adaptation of bat echolocation to find ways to help **blind people** detect their surroundings, where :

Scientists have created a special cane that emits a high-pitched sound just like bats do.

As a blind person is walking with this special cane, an **echo** of this high-pitched sound is picked up by this special cane.

The echo is turned into **vibrations** that the person can feel with his thumb.

The vibrations of the special cane tell the blind person the direction of the obstacles and objects around him.



#### 🛡 Note

Humans cannot hear the high-pitched sounds produced either from bats or the special cane of blind people.

In this table we can summarize the similarities and differences between the special cane of blind person and bat echolocation.

#### Special cane of blind person

#### Bat

#### **Similarities**

- The special cane of blind person and bats emit a high-pitched sound that bounces off objects as an echo.
- This special cane and bats receive the echo that can tell how far away objects are.

#### Differences

- This special cane picks up an echo from the sound it emits and changes it into a vibration that can tell the blind person where objects are around him.
- Bats pick up an echo from the sound they emit but they don't change it into vibrations.

#### Check your understanding

- ▶ Put (√) or (x) :
  - 1. Bats make low-pitched sound and then listen for an echo.
  - 2. Bats can change the echo into vibrations.

#### Review on Concept (1.2)

To review this concept look at the Assessment Book "Part 2: Final Revision".

#### In the Assessment Book:

#### Try to answer:

- Self-Assessment (9)
- Model Exam on Concepts (1.1) & (1.2)

### **Exercises on Lesson 4**

Understan

O Apply

Higher Thinking Skills

1	C	hoose the correc	t answer :			
ļ	1.	Sending smelly	messages when th	nere is a shortage	of food is the	role
		of				
l		a. queen ants.	b. nurse ants.	c. scout ants.	d. soldier ar	nts.
-	2.	Locating food is	the role of			
		a. queen ants.	b. nurse ants.	c. scout ants.	d. soldier ar	nts.
•	3.	Alarming the col	ony from dangers	is the role of	••	
		a. queen ants.	b. nurse ants.	c. scout ants.	d. soldier ar	nts.
•	4.	Humpback whal	es sing during	months, which	is the mating	season.
Ì		a. winter	b. summer	c. spring	d. autumn	
	5.	Sense organs co	ollect information a	and send signals t	o for pr	ocessing and
l		understanding.				(Port Said 2022,
ļ			b. legs		d. stomach	
•	6.	Bats use their	to get informa	ation about their su	urroundings in	the dark.
		a. nose	b. tongue	c. eyes	d. ears	(Gharbia 2022)
•	<b>7.</b>	Echolocation in	some animals is th	e use of pito	ched sounds fo	or finding food.
ļ		a. medium	b. low	c. very low	d. high	
•	8.	use echol	ocation by bounci	ng high-pitched so	ounds in the a	ir.
		a. Bats	b. Dolphins	c. Whales	d. Snakes	(Alex. 2023)
0	9.	The echo is turn	ned into that	a blind man can f	eel in his thur	nb while
		holding his spec				
ĺ			b. light		d. water	
	10.	The blind persor	n's cane and	emit a high-pitche	d sound that b	ounces off
		objects forming				
		a. lizards	•	c. bull sharks		
į	11.	-	back whales in wir	nter are characteri	zed by each o	of the following
		except				1-1
				b. travelling bett		
		c. having sharp		d. having low-pi		
	12.	_		be humpbacks' life	e, <u>except</u>	•••
		8000	municate in cold	and warm water.		
		-	n winter months.	••		
		-	veak hearing sens		de	
ļ		a. triey commun	iicate with each of	ther through sound	JO.	

2	Choose from column (B) what suits it in column (A):			
	(A)	(B)		
	<ol> <li>Nurse ants</li> <li>Scout ants</li> <li>Soldier ants</li> </ol>	<ul> <li>a. are responsible for reproduction and laying eggs.</li> <li>b. are responsible for warning from dangers.</li> <li>c. are responsible for locating food.</li> <li>d. are responsible for sending smelly messages when the amount of food decreases.</li> </ul>		
	1	2		
3	Put (✓) or (X) :			
)	1. It is impossible to	to design technology inspired by the adaptations of some livin	g	
	organisms arou	nd us. (	)	
•	•	invented to help a person who has lost the sense of hearing. (	)	
•	3. The sound pitch	from a blind person's cane is too high for humans to hear. (	)	
		nto light that a blind man can feel while holding his		
	special cane.		)	
		bility to change echo into vibrations just as the canes	٠,	
	of blind persons		) \	
		nnological systems as we do. (	) \	
		inicate with each other by using different senses. ( les communicate with each other through flashing. (	)	
	•	<u> </u>	)	
	•	les produce more than one type of songs. (Giza 2023) (	) \	
	· ·	ales can sing under water. (	)	
	ense organs d	can decode the information that is sent by the brain. (		
į	Correct the under	rlined words:		
	1. Groups of ants	within a colony have <u>similar</u> roles. (	•	
2. Scout ants are responsible for alarming the colony in danger.		responsible for alarming the colony in danger. (	)	
	3. Humpback wha	les have similar sounds according to the season. (	•	
	4. Humpback wha	les produce low-pitched sounds in winter. (	)	
	5. Low-pitched so	unds travel better through cold water. (	)	
5	Write the scientif	ic term of each of the following :		
	1. A season in which the humpback whale produces high-pitched sound.			

2. A season in which the humpback whale produces low-pitched sound.

•	3.	Small living organisms that live in colonies and communicate with eather by smally magazine to perform different roles.	
		other by smelly messages to perform different roles. (Giza 2024)	()
Ĭ	4.	A group of ants which is responsible for sending smelly messages	1
		<del>-</del>	()
Ì	5.	Pitched sounds which travel through cold water better than through	
		warm water.	()
ĺ	6.	Pitched sounds which travel through warm water better than throug cold water.	n ()
	7.		()
•		_	()
		A living organism that can fly and depend on the echolocation prope	
	J.		()
ļ	10.	-	()
			(······)
6	C	omplete the following sentences :	
	1.	Bats and the special cane of blind people are similar in using	•••••
		property to locate objects.	
1	2.	A group of ants sends messages to communicate with ea	ch other.
1	3.	Ants use their sense of to communicate with each other.	
-	4.	Ants within a colony are divided into several groups such as	ants,
		ants and ants, where each group do a specific r	ole.
	5.	Humpback whales communicate with each other by using the sense	e of
		, where they sing a wide range of and a series of	of
			(Minia 2023)
	6.	In winter months, the songs of humpback whales have pit	tched sound,
		because these sounds travel better through water.	
	7.	In months, the songs of humpback whales have	. pitched
		sound, because these sounds travel better through warm water.	(Sharkia 2024)
-	8.	Humans can communicate with each other where ears of human de	etect
		and eyes of human detect	
1	9.	Ants are similar to the tree in that both of them send sme	lly messages
		for communication with other members of their species.	
	10.	The echo that is picked up by the special cane of a blind person is	turned into
1		that the person can feel them with his thumh	

Give reasons for :	
1. The nurse ants send smelly messages to scout a	ants.
2. The soldier ants use smells in their communication	
3. The songs of humpback whales have high-pitche	ed sounds during winter months.
4. Humpback whales sing different songs.	(Cairo 2024)
5. The echo that is picked up by the special cane o vibrations.	f blind people is turned into
6. The blind people cannot hear the sound that emi	
What happens if?	
The smell sense of ants becomes weak.	
The amount of food in the ants colony decreases	
There is a danger near to an ants colony.	(Cairo 2024)
High-pitched sound that is produced by the blind	person's cane hits an object.
5. Bats cannot use echolocation property.	
6. There is a wall in front of a blind person uses his	000 € 4 € 0.0000 (000.000 to 0000
7. The hearing sense of humpback whales become	na vienia nelikin enien kunta nima nelikinima.

# Model 1 Exam

### On Concept [1.2]

Total	mark
1	5

(A	) Choose the correct answer:		(5 marks)
	Senses that can distinguish between ma. taste and sight.c. sight and hearing.	nilk and water are b. smell and hearing. d. taste and hearing.	
	Bats can fly without hitting walls becau a. hear the echo reflected from them. b. touch them. c. see them clearly at night. d. smell them.	se they can	
	When your hand touches the spines of a. one minute. c. more than one hour.	a cactus plant, it is without b. two minutes.  d. less than one second	
	Brain, nerves and sensory receptors are a. only sensory receptors work individually. b. only the brain works individually. c. all of them work together. d. each of them work separately.  Give a reason for the following:  The Egyptian jerboa has long hind leg	aally.	em, where
_			
	A) Correct the underlined words :		(5 marks)
1.	When you hear the fire alarm, your ey	es send a signal to the b	
			()
2.	The <u>spinal cord</u> is responsible for proceed coming from ears through nerves.	cessing the information	()
3.	The dog has sharp senses of smell ar	nd taste.	()
4.	The sense of sight in bats is stronger	than that in owls.	()
(B	) What happens if?		
	Owls cannot turn their heads in all dir	ections.	

(A) Write the scientific term of each of the following:	
1. A living organism that can fly and depe	
information about its surroundings in the	ne dark. ()
2. A season in which the humpback whal	e produces low-pitched sound.
	()
3. Sense organ that can detect the odors	. ()
4. A group of messages sent by nervous	system that are often so fast that you
cannot realize them.	()
	to communicate with their surroundings, adaptation. And then mention the name
Device	Inspired from the adaptation of

### Model 2 Exam

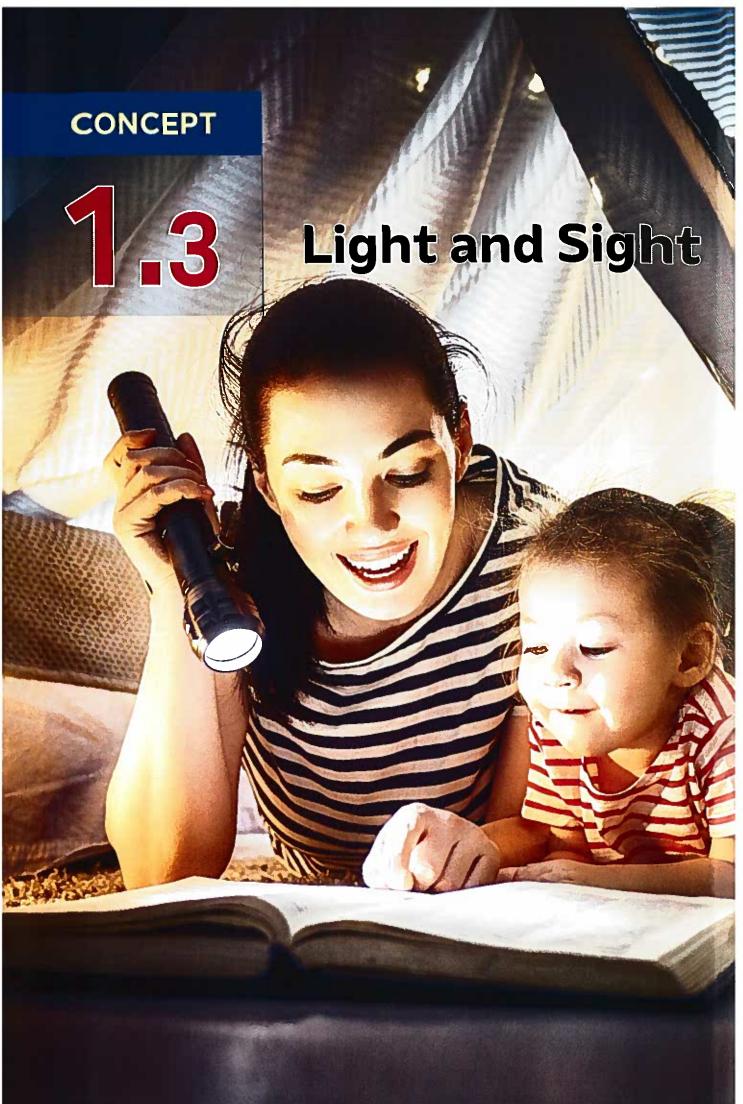
### On Concept [1.2]



1	(A) Write the scientific term of each of the following:	(5 marks)
	1. The time taken by an organism's body to respond to different in	formation
	around it.	()
	2. A sense by which you can recognize the sour flavor of vinegar.	()
	3. A system that controls all the body functions and nerves are on	e of its parts.
		()
	4. The organ which receives and processes the messages sent fr	om the sensory
	receptors that are found in a jerboa's ears.	()
	(B) Look at the opposite figure that shows the structure of the human nervous system, then answer the questions :	
	1. Which part spreads all around the human body?  Nerves	
	2. Which part is found inside the backbone of the human body?	A A A
	3. Which part represents the main control center in the human body?	
2	(A) Complete the following sentences :	(5 marks)
	1. The is the organ that sends information through nerves you smell the scent of a perfume.	to the brain when
	2. Ants use their sense of to communicate with each other.	
	3. Hopping of the Egyptian jerboa in zigzag patterns is considere adaptation.	d as a
	4. Owls can detect the places of their preys by using the super s	enses of

and .....

	(B)	) Order the following statements which explain how the brain processes information :				
		() The brain sends a signal to the muscles of his leg to move to the race.	star	rt		
		() Hearing the whistle sound to start the race.				
		() The brain processes information.				
		() The nerves of the ears send a signal to the brain.				
3	(A)	Put (\(\nu\)) or (\(\lambda\)):	5 mark	(s)		
	1. A	Animals use technological systems as we do.	(	)		
	2. F	Humpback whales communicate with each other through flashing.	(	)		
	3. 7	The sound pitch from a blind person's cane is too high for humans to hear.	(	)		
	4. E	Echolocation is a type of communication between owls.	(	)		
	(B)	What happens if?				
		The amount of food in ants colony decreases.				
		199				



### Notes For Parents

### On Concept (1.3)

Lessons	Activities	What you should do with your child
	Activity 1	Discuss with your child how the vision process occurs in humans and animals.
1	Activity 2	Discuss with your child how humans and fishing cats see things in low-light places.
	Activity 3	Explain to your child the meaning of "sources of light" and mention some examples of them.
	Activity 4	Let your child do an experiment to know how light interact with different types of materials.
2	Activity 5	Discuss with your child the meaning of opaque and transparent objects, and how the reflected light depends on the smoothness of the reflecting surface.
	Activity 6	Discuss with your child the way through which firefly beetles communicate.
3	Activity 7	Let your child classify the different types of communication used by humans, animals or both of them.
4	Activity 8	Explain to your child the meaning of "code" that humans can use to transfer information.



#### Learning outcomes

### By the end of this concept, your child will be able to:

- Describe how light transfers energy across distances.
- Develop a model that describes how the behavior of light enables the eye to see objects.
- Explain how adaptations help some animals gather information.
- Argue, using evidence that light allows for the transfer of information through systems of communication.

#### Key vocabulary

- Light
- Matter
- Opaque
- Eye pupil
- Reflect
- Transparent
- Transfer of information

### **LESSON ONE**

### **Activity 1 Can You Explain?**





- In the previous concept, you have learned that animals have senses like humans.
- · Humans and animals have nerves that send information from the sense organs to the brain for processing information.

#### Do you know what is the organ that is affected by light in humans and animals and how they can see things in low-light places?

- The eye is the sense organ of sight that is affected by light in humans and animals.
- Humans need more light in low-light places to see clearly.
- Some animals such as fishing cat can see better than humans in the low-light places.

#### In this concept, we will study :

- Some animals that can hunt in the low-light places.
- Light is a form of energy.
- Some special structures in the eyes of some animals.
- How we can see different objects around us.
- · Reflection of light.
- How some living organisms use light in communication.

### **Activity 2** Hunting with Night Vision

#### ▶ Look at the opposite picture, then put $(\checkmark)$ or (x):

- Eye is the sense organ that humans depend on to see the surroundings.
- Presence of sound is important for humans to see the surroundings clearly.



#### Night vision in humans:

- Human eyes need more light to see well in the low-light places.
- Without more light humans would need a device known as "night vision goggles" to see in the dark.



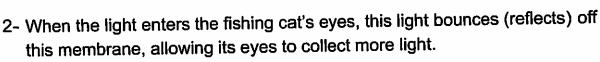
Night vision goggles

#### Night vision in animals:

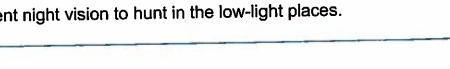
The structure of eyes of some animals help them see in the dark such as the fishing cat.

#### The fishing cat

- It is a wild cat and considered as one of nocturnal animals that hunts for food at night.
- The fishing cat's eyes seem to glow in the dark because :
  - 1- It has a mirror-like membrane at the back of its eyes.



- This structural adaptation of the fishing cat's eyes, is found in all cats and allow them to have excellent night vision to hunt in the low-light places.



#### The ability of humans and nocturnal animals to see in the dark:

Points of comparison	Humans	Nocturnal animals
• Size of the eye :	Small eye	Big eye
• Eye pupil :	Opens narrower	Opens wider
		(to allow more light enter their eyes)
	eye pupil	eye pupil
	The same of the sa	
	Human eye	Cat eyes



Some nocturnal animals can see in the weakest light levels, but in complete darkness they depend on other senses such as hearing and smelling that help them to hunt their preys and to avoid their predators.

#### ▶ What happens if ... ?

The fishing cat eyes don't have mirror-like membrane.

It cannot see clearly and hunt at nights.

### Check your understanding

- Put (√) or (x):
  - 1. The type of adaptation in the fishing cat to see in the low-light places is a behavioral adaptation.
  - 2. All cats have a mirror-like membrane in their eyes.
- ▶ Choose the correct answer :

If the human eyes contain a mirror-like membrane, so his eyes ......in the low-light places.

- a. gather low amount of light
- b. need a night vision goggles

c. appear black

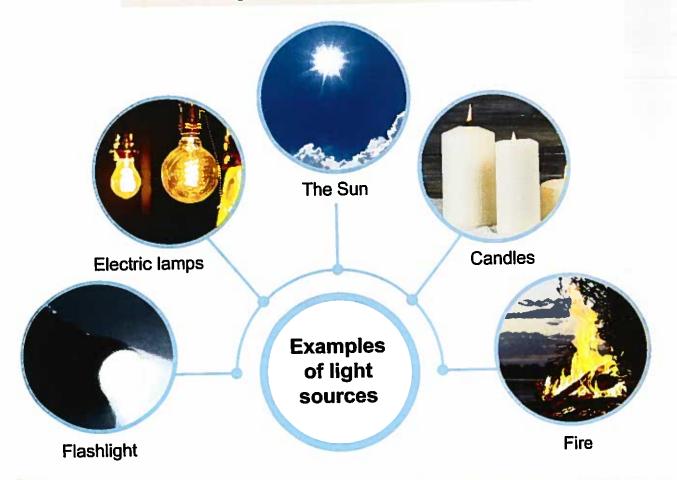
d appear bright

# Activity 3 What Do You Already Know About Light and Sight?

#### Sources of light:

#### A source of light:

It is something that emits (gives off) its own light.

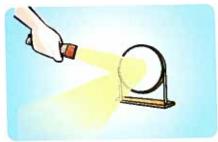


#### **Note**

There are other objects that don't emit light, but they reflect the light falling on them, so they are not considered as sources of light such as:



The moon (reflects the sunlight)

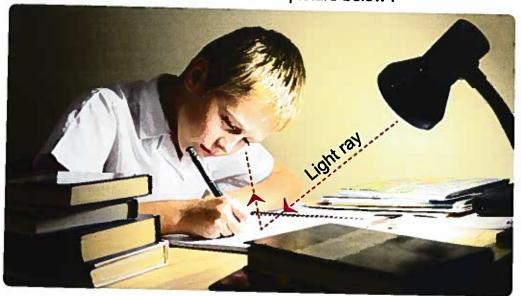


The mirror (reflects the flashlight)

#### How we see:

When the source of light emits its own light rays.

- The light rays fall on objects.
- Then, they will bounce off these objects and reach our eyes.
- So, we can see these objects, as shown in the picture below:



#### From the previous explanation we conclude that:

#### Light:

It is a visible form of energy that travels in the form of waves.



In complete darkness, we can't see anything because without light bouncing off the objects into our eyes, everything will look black.

### Check your understanding

Complete:

There are many sources of light such as ....., and \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

▶ Put (√) or (x):

- 1. The light falling on objects bounces back to reach the eye so that we can see these objects.
- 2. The moon is considered a source of light, so it appears bright at night. (

In the Assessment Book:

Try to answer:

Self-Assessment (10)

### **Exercises on Lesson 1**

Understand

O Apply

Higher Thinking Skills

Choose the correct answer:	
1. Which of the following organs are wor	king together for seeing different
objects?	(Nair El-Sheikh 2022)
a. Nose and brain.	b. Eyes and brain.
c. Ears and brain.	d. Tongue and brain.
2. Humans have eyes than noctur	nal animals.
a. bigger	b. smaller
c. stronger	d. sharper
3. The pupils of human eyes open	. that of nocturnal animals.
a. typical to	D. narrowei uiaii
c. wider than	d. similar to
4. The wide eye pupils of fishing cat, all	ows amount of light to enter its eyes
than those of human eyes.	
a. little b. large	c. very small d. small
5. Nocturnal animals depend on all the	following senses to find out their preys
at night, except	
a. sight sense.	b. hearing sense.
c. taste sense.	d. smelling sense.
6. The mirror-like membrane of the fish	ing cat is present
a. inside the stomach.	b. at the back of the brain.
c. inside the lungs.	d. at the back of the eye.
7. Which of the following do not need a	big amount of light to see in the dark?
a. Both humans and cats.	b. Neither numans not cats.
c. Cats only.	d. Humans only.
. To detect the place of a table in a co	mpletely dark room, you can depend on
a. sight sense.	b. touch sense.
c. taste sense.	d. hearing sense.
🍦 9. If someone walking in a dark place	without hitting anything around him, so this
person may	
a. have a big ability to taste.	b. have a big ability to breathe.
c. have a big ability to smell.	<ul> <li>d. wear night vision goggles.</li> </ul>
10. The character that helps the fishing	ig cat to hunt a prey at night, is its
ability	
a. to see the sunlight.	b. of poor night vision.
c. to digest its prey easily.	d. of excellent night vision.
I of the disposition business.	

•	11. The eyes of fishing cats glow at night, b	pecause their eyes		
	a. emit their own light.	b. can reflect light.		
	c. are small in size.	d. have narrow pupils.		
,	12. The sight process occurs as follows			
	a. light falls on the eyes, then reflected to	o the objects.		
	b. light falls on the objects, then reflected	d into the eyes.		
	c. sound falls on the ears, then reflected	to the objects.		
	d. sound falls on the objects, then reflect			
	13. The function of the mirror-like membrar the function of	ne in the fishing cat's eyes	i, looks li	ke
	a. night vision goggles.	b. radio.		
	c. black paper.	d. white paper.		
	14. In the fishing cat's eyes, the mirror-like		nt structur	re
	because it helps them to at night.	•		
	a. sleep	b. breathe		
	c. keep their body warm	d. hunt a prey		
	15. All the following things are considered a	as light sources, <u>except</u>	•••••	
	a. the Sun.	b. fire.		
	c. eyes.	d. the light lamp.	(Cairo	2022)
	16. We can see both the Sun and the moor	n, because light		
	a. bounces off both of them.			
	b. is emitted from both of them.			
	c. bounces off the Sun and is emitted fro	m the moon.		
	<ul> <li>d. bounces off the moon and is emitted free free free free free free free fr</li></ul>			
	17. The energy which must present to make	e our eyes able to see the	objects	
	around us is energy.		(Cairo	2022)
	a. sound b. electric	c. light d. m	agnetic	
Ì	Put (✓) or (X) :			
	Eyes are considered as sensory organs	of light not as a source	of liabt /	, \
	2. Sight is the sense on which humans and	d animals depend to see t	וויר. ( יירי	( )
	surroundings.	u animais depend to see i	ine 1	, ,
	3. Cats have excellent night vision, while h	numans are not (A)	) 	, ,
	4. Both of the moon and the cat's eyes refl		ex. 2024) (	. ,
	5. The mirror-like membrane that is preser is not present in other cat species.	it at the back of a fishing	cat's eyes	S,
		s aansministatis alauts us s	(	, )
	6. We can see the mirror that presents in a		(	)
	7. Big eyes of fishing cat allow to collect and	व reflect any little amount (	of light. (	)
				137

8. If the human has a mirror-like membrane at the back of I	nis eyes,	
he can see clearly in the low-light places.	(	)
9. The light that enters the human eyes allows him to distin	iguish between wea	ak
and strong sounds.	(	)
10. The moon is not considered as a light source.	(Cairo 2023) (	)
11. We can see the moon bright although it doesn't emit any	/ light. (Giza 2024) (	)
12. Light rays fall on objects then reflect off these objects in	to our eyes,causing	J
vision.	(	)
Complete the following sentences using the words below	:	-
(source of light — mirror-like membrane — more light	– bounce off)	
1. Human eyes need to see clearly in the low-light pla		
	(Qalyubia 2	(024)
2. All cats have a at the back of their eyes.	(4-)	
3. Any object that gives off its own light is called a	octs to our eves.	
4. We can see objects when the light rays these obje		
Write the scientific term of each of the following :		
1. The organ that is affected by light and responsible for sig	jht.	
	(Giza 2024) <b>(</b>	
2. A species of nocturnal wild cats, whose eyes glow at nig	ht. (	)
3. Objects that emit their own light.	(	)
4. The organ that is responsible for processing information	received	_
by eyes, to know and recognize the surroundings.	(	)
<ol><li>A body that appears lighted in the sky, but it is not consi</li></ol>	dered	
as a source of light.	(Giza 2023) (	
6. A tool that the human can depend on to see in the dark.	(	)
7. The structural adaptation that gives fishing cat an excell	ent	,
night vision.	(	
8. The visible form of energy that enables us to see.	(Cairo 2023) (	)
Correct the underlined words:		
1. Humans and cats are <u>similar</u> in their seeing ability at nig	ght. (	)
2. The energy that helps humans and animals see, is the		
sound energy.	(Minia 2022) <b>(</b>	
3. The moon is one of the light sources in the sky.	(Giza 2023) <b>(</b>	)
4. The system that works with the eyes of living organisms	s for seeing	
objects is the digestive system.	(	)

5. Cats eyes glow at night due to at the front of their eyes.	the presence of a mirror-like mer	mbrane (
6. Sound is a visible form of ener	gy that bounces off objects into o	\
		ur eyes. 024) (
7. Eves send messages to the he	eart for processing information.	
8. In a completely dark room, eve	erything looks <u>red</u> due to the abse	(
o a completely dark room, eve	myumig looks <u>red</u> due to the abse	
		(
Complete the following sentenc	es:	
🍦 1. The fishing cat can hunt at nigl	ht depending on the excellent sen	se of
2. The fishing cat can hunt at nigl	ht due to the bouncing off	energy
	•	(Beni-suef 2024)
3. The eyes of fishing cat have a	mirror-like membrane bounces of	f the light and
this is considered as a	adaptation.	(Beni-suef 2022)
4. Eyes of human areth		d pupils of
nocturnal animals open	than that of human.	a papilo Oi
5. In complete darkness, nocturna		es —
such as and		
6. To see things clearly at night, h	umans need a source of	but
animals can hunt at night depe	nding on their excellent night visio	on.
7. Human can see objects which go		
8. Among the objects which give of	off their own light are the Sun and	
while and ard	re objects that bounce off light.	,
Give reasons for :	H _ H 1044 _ 1044	
1. The fishing cat's eyes seem to	glow in the dark.	
		••••••••••••••••••••••••••••••
2. Candle is considered as a source		•••••••••••
•••••		***************************************
0.71		***************************************
3. The eye pupil of nocturnal anima	als differs from that of the human.	•
••••••		•••••
	***************************************	

0	4. In the presence of light, we can see objects around us.	*******	••
	5. The moon appears bright although it is not source of light. (Cairo	2024	 9 
8	What happens if?		••
•	The mirror-like membrane in the fishing cat's eyes is not present. (Dakahlia)	2024 	1) 
	2. The moon can't reflect the sunlight.		***
9	Cross out the odd word:  1. Flashlight – The moon – Fire.  2. The moon – Mirror – Candle.  (Minia 2023) (		
10	Study the following three figures, then put ( $\checkmark$ ) or ( $X$ ):		<u>_</u>
	Figure (2) Figure (3)	<u>-</u>	7
	1. Human's eyes can see the ball in figure (3), because the ball emits light.	(	)
	2. Figure (2) is not correct, because human's eyes don't emit light.	(	)
	<ol> <li>Figure (1) is correct, because the light ray of the flashlight bounces off the ball to the human's eyes.</li> </ol>	(	)

### **LESSON TWO**

### **Activity 4 Light Reflection**

Choose	the	correct	ancwar	
CHUUSE	uie	correct	answer	•

Which one of the following objects is shiny and smooth? .....

- a. Plastic spoon.
- b. Wooden chair.
- c. Mirror.

d. T-shirt.

In this activity, we will do an experiment that shows how light interacts with different types of materials:

Materials: a flashlight – a mirror – a piece of wood – a piece of plastic – a piece of metal – a piece of cloth – paper – a piece of aluminum foil.

Steps	Figures	Observations
Turn on the flashlight and direct it towards a mirror.		- The mirror reflects most amount of the light.
2. Turn on the flashlight and direct it towards a piece of wood.		- The piece of wood reflects less amount of the light.
3. Repeat the previous step using the other materials.		

#### **Conclusions:**

- 1. Shiny and smooth materials reflect large amount of the light that falls on them, such as the mirror, the piece of metal and the piece of aluminum foil.
- 2. Rough materials reflect small amount of the light that falls on them, such as the piece of wood, the piece of plastic, the piece of cloth and paper.

### Check your understanding

#### ▶ Put (√) or (x):

- 1. Shiny objects reflect light better than rough objects.
- 2. Wood reflects more light than a mirror does.

( )

interact shiny direct يتفاعل smooth لامع

materials توجيه تاعم rough مواد

#### **Activity 5 Light Strikes Different Matter**

In this activity, we will study what happens to light when it hits different types of matter.

#### **Light strikes matter**

Light is a form of energy that travels in straight lines in the form of light waves.

#### When the light hits an object

- Some of the light energy is absorbed by the object's surface.
- Some of the light energy reflects (bounces) off the object's surface.
- Some of the light energy may go through the object.

So, according to the previous explanation, objects can be classified into two groups which are:

#### Transparent objects Opaque objects - They are objects - They are objects that allow light that don't allow light to pass through. to pass through. Transparent object Opaque object - Things can be seen through them. - Things can't be seen through them. Examples: Examples: air, water, glass windows and lenses. rocks, wood, metals and the human body.

#### Why do you see your body shadow?

Your body is an opaque object that forms shadow, because the light that hits your body either bounces off or is absorbed but no light passes through your body.



shadow

form يمنص

opaque طل hit / strike صورة

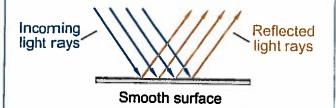
straight معن transparent مستقيم شفاق

142

▶ The direction of the reflected light rays depends on the smoothness of the surface, where :

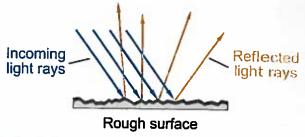
#### **Smooth Surface**

 If the surface is smooth (such as a mirror), the light rays will reflect in one direction with the same angle at which they strike (hit) the object originally.



#### **Rough Surface**

 If the surface is rough (such as a painted surface), the reflected light rays will scatter or diffuse in different directions.



How does light striking matter make it possible for humans and animals to see?

When light rays strike an object, light reflects (bounces) off this object.

The reflected light travels in a straight line into the eyes.

Special nerves in the eyes send messages to the brain.

The brain interprets the messages as an image of this object.

#### 1

#### **Check** your understanding

- Write the scientific term :
  - 1. Objects that allow light to pass through.
  - 2. Objects that don't allow light to pass through.

,															
(						٠	•		•				•		)
(		,													)

In the Assessment Book:

Try to answer:

Self-Assessment (11)

### **Exercises on Lesson 2**

Higher Thinking Skills O Apply Understand Choose the correct answer: 1. Light travels in ..... lines in the form of waves. d. circular c. straight b. zigzag a. curved 2. When light rays hit an object, all the following sentences are correct, (Cairo 2022) except ..... a. some of this rays is absorbed by the object. b. some of this rays is bounced off the object. c. some of this rays may go through the object. d. all of this rays are absorbed by the object. 3. A shadow of an object is formed because ..... a. light can pass through the object. b. light cannot pass through the object. c. this object is made of glass. d. this object is transparent. 4. Opaque material ..... a. allows light to pass through. b. absorbs some of light that falls on it only. c. reflects some of light that falls on it only. d. absorbs some of light that falls on it and reflects the other. 5. All of the following are transparent objects, except ..... (Cairo 2022) d. air. b. water. c. paper. a. glass. 6. ..... allows most of light to pass through, while ...... don't. d. Glass - wood c. Wood -- glass b. Glass - air a. Air - glass 7. Mirror causes falling light rays to ..... a. pass through it. b. reflect at the same angle they strick the mirror. c. reflect in different directions. d. diffuse like that of rough surfaces. 8. Our eyes, ..... a. can see through both opaque and transparent objects. b. cannot see through both opaque and transparent objects.

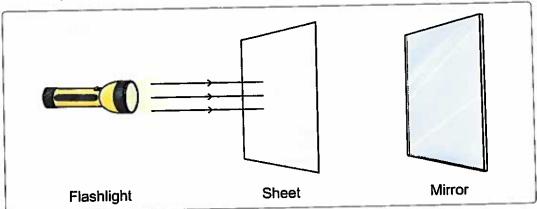
c. can see through opaque objects, but not through transparent objects. d. can see through transparent objects, but not through opaque objects.

<ul><li>a. you can see</li><li>b. you cannot see</li><li>c. you can see</li><li>d. light can pass</li></ul>	the glass sheet the see the wood shee the wood sheet the through both shee		et. sheet. et.			
a. wood.	b. paper.	es, so they are made c. glass.	e up ofd. meta	•		
Choose from colu	nn (B) what suits i	it in column (A) :				
(A)		(B)				
<ol> <li>Mirror</li> <li>Piece of cloth</li> <li>Reflected light</li> <li>Lenses</li> </ol>	<ul><li>b. It is considered</li><li>c. It is a rough suit</li><li>d. It is the light that</li></ul>	ent piece that allows as a source of light face that scatters re at bounces off a refle nd shiny surface tha	t. eflected light ra ecting surface.	ays.		
1	2	3	4			
<ol> <li>Both wooden pie at which they str</li> <li>Mirror reflects m</li> </ol>	end to reflect light lece and paper reflect tuck them. tost of incoming lig	s and lenses. better than smooth o ect incoming light ra ht rays that fall on it oothness of the obje	objects. ys at the same	2024) ( ) e angle ( ) ( )		
Write the scientific term of each of the following:  1. Materials that allow light to pass through. (Cairo 2022/2023) (						
Correct the underl	ined words :	1 PET		- 1 (1 (1 ) (1 ) (1 ) (1 ) (1 ) (1 ) (1		
1. We see the objec	ts as a result of the	absorption of light r				
2. <u>Opaque</u> materials 3. <u>Rough</u> objects ret which they struck	flect light rays in on	ss, air and lenses. le direction at the sa	(	()		

6	Co	omplete the following sentences:
-	1.	Light travels in lines. (Dakahlia 2022)
÷	2.	Light travels in the form of
0	3.	Objects that light can't pass through are called, while objects that allow light to pass through are called
		A tree forms a shadow as it is an object that doesn't allow to pass through.
•		Cloth and paper are considered surfaces that scatter or diffuse (Giza 2024)
•	6.	Human body, wood and are considered materials which light to pass through.
	7.	Smooth surface of materials reflect light rays in direction with same at which they strike the object.
i	8.	Things can be seen through objects such as and and
7	G	ive reasons for :
0	1.	Shadow of an opaque body is formed when light falls on it. (Dakahlia 2024)
•	2.	You can see an object placed behined a glass cup.
	3.	A mirror can reflect light better than a painted surface. (Giza 2023)
[	N	/hat happens if?
•	1.	You place a wood sheet between a light source and a wall.
	2.	Light falls on a transparent body such as a glass window.
	3.	Light falls on a rough surface.

Arrange the following statements to s see different objects:	how the correct sequence of how humans
() Special nerves in the eyes	s send messages to the brain
() The reflected light rays tra	vels in a straight line into the even
() The brain interprets the m	essages as an image
() Light rays reflect off object	s around us.
Look at the following figures, then ans	wer the questions below: (Giza 2022)
Figure (a)  1. Complete:	Figure (b)
·	
- Because	
- Because	
c. In the previous two figures, the falling travels in lines.	ng and reflected rays show that light
2. Choose :	
The surface in figure (a) may be	(Cairo 2024)
a. plastic. b. wood.	c. mirror. d. cloth.
1 Classify the following materials into sm	ooth materials and rough materials :
" Cloth – Mirror – Woo	od – Metal – Paper "
Smooth materials	Rough materials
2 Classify the following materials into ope	
" Wood – Air – Wa	ter – Metal – Lenses " (Alex. 2024)
Opaque objects	Transparent objects

#### 13 Study the following figure that shows a sheet placed between a flashlight and a mirror, then choose the correct answer:



- 1. The mirror can reflect the light rays, if the sheet is made up of ...... ( wood - glass )
- 2. If we replaced the sheet with another mirror, it will ...... the light rays. (pass - reflect)

#### 14 Cross out the odd word:

- (.....) 1. Water - Wood - Air - Glass.
- 2. Metal Rock Cloth Paper.

### 15 Look at the opposite figure, then answer the questions below:

- 1. The shadow of the tree is formed, because the tree is .....object that doesn't allow light to pass through.
- 2. Some of light rays fall on the tree are ....., while the other light rays are .....
- 3. The surface of the tree body is ....., so the reflected light rays are in different directions.



### **LESSON THREE**

### **Activity 6 Firefly Light Show**

#### Look at the opposite photo, then put (√) or (x):

- 1. The firefly beetle is considered as a type of insect. ( )
- 2. The firefly beetle can produce light. (



Firefly beetle

)

### How do fireflies beetles produce the lights they use to communicate?

- Fireflies beetles are type of insects that can produce a chemical reaction inside their bodies that allows them to light up and communicate with other fireflies.
- ► How do fireflies use their senses to communicate?
  - 1. Fireflies use their wings to form different flash patterns to :
    - Warn off other firefly beetles from predators.
    - Attract a mate to reproduce.
  - They flash at regular periods of time, but if there is another group of fireflies flashing nearby, they will change their own flash pattern to match the flash pattern of the other group to communicate.
- **Note**

Humans use lights to communicate with each other to transfer information such as using traffic lights.

### Check your understanding

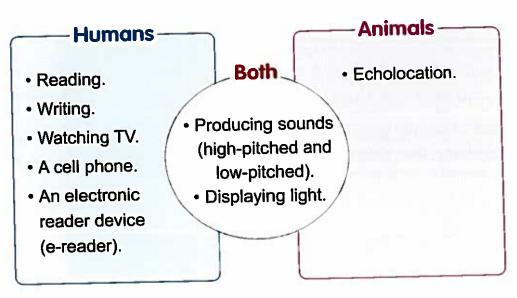
- ► Choose the correct answer:
  - 1. The chemical reaction inside firefly beetles allow them to .....
    - a. reflect the sunlight.
- b. reflect the moon light.
- c. produce their own light.
- d. produce their own sound.
- 2. Firefly beetles use different flash patterns for ......
  - a. warning off from predators only.
  - b. attracting mates only.
  - c. warning off from predators and attracting mates.
  - d. warning off from mates and attracting predators.

## Activity 7 What Do You Already Know About Communication and Information Transfer?

 There are some similarities and differences between types of communication and transferring information in humans and animals.



▶ The following figure shows some different types of communication in humans, animals and both :



### Check your understanding

- ▶ Choose the correct answer :
  - 1. ....is considered as a type of communication that is used by humans only.

( Echolocation - A cell phone - Displaying light )

2. \_\_\_\_\_ is considered as a type of communication that is used by animals only.( Writing – Echolocation – High-pitched sound )

In the Assessment Book:
Try to answer:
Self-Assessment (12)

## **Exercises on Lesson 3**

	<ul><li>Understa</li></ul>	nd	• Apply				
		C Waladara		<ul> <li>Higher Thinking Skills</li> </ul>			
1	Choose the corre	ct answer :					
i	1. A firefly is not a	bird, but it is	a type of	••••	(Shark	(ia 2	024
l	a. amphibians.	b. lizards	<b>3</b> .	c. beetles.	d. reptiles.		,
i	2. Which of the following is not a reason for fireflies to produ				a flash light	?	
۱	a. To attract a mate.			b. For communication.			
l	c. To warn off from predators.			1 =			
60	3. Changing the pattern of lighting up in a firefly is an example of adaptation(s).						
	<ul> <li>a. structural and behavioral</li> </ul>			b. camouflage and behavioral			
	c. only structural			d. only behavioral			
1	4. People can use	the following	ways to co	mmunicate, except	•••••		
	a. reading.	<ul><li>b. writing</li></ul>	<b>).</b>	c. speaking.	d. flying.		
	<ol><li>The ability to co animals.</li></ol>	mmunicate th	rough writir	ng and speech sepai	rates f	rom	
	a. humans	b. animal	ls	c. plants	d. non living	ı thir	nas
6. Reading and writing are common types of communication in						,	- <b>J</b> -
					Giza 2022 / Cair	ro 20	)23)
	a. humans			c. birds	d. plants		
		. Displaying light is a type of communication			oth		
a. plants and anii				b. plants and humans.			
	c. animals and h	umans. d. r		d. plants and non liv	. plants and non living things.		
	Choose from column (B) what suits it in column (A):						
	(A)	(B)					
	1. Watching TV	a. is a type of communication in plants only.					
	2. Echolocation	b. is a type of communication in animals only.					
	3. Displaying light	c. is a type of communication in humans only.					
	d. is a type of communication in both animals and humans.						
	1		2		3		
	Put (\( \sigma \) or (\( \x \) :				and the second		-
Fireflies produce flash lights to warn off from predators.     ( )							`
2. Fireflies are wingless beetles.						(	)
							)

• 3. Speaking is the only way to com	nmunicate with people.	(Giza 2023) ( )
4. Echolocation is a type of community of the state of th	unication between humar	is. ( ) that allows
them to light up.	ACHOLI III SIGE LI ICII DOGIOS (	( )
6. A cell phone is a device that is u	used in communication be	etween humans. ( )
4 Complete the following sentence		
1. Fireflies use the sense of	. to communicate with ea	ch other. (Cairo 2023)
2. Fireflies produce flash patterns	to attract to reprod	luce.
3. Fireflies communicate with eac that makes them light up.		
4. A group of fireflies can change another group to communicate	•	
5. Watching TV is a type of comm	nunication that use the se	nses of and
6. Among the types of communication and		
7. The types of communication the	nat are used by both anim	als and humans
5 Give reasons for :		
1. Humans receive and send info	rmation through speaking	g, writing and reading.
2. Fireflies use different patterns	of flash lights to commun	icate with each other.
	***************************************	***************************************
3. Fireflies produce a chemical re	eaction inside their bodies	5 <b>.</b>
6 What happens if?		(O-i 2022)
A firefly wants to attract a mate t	to reproduce.	(Cairo 2023)
Put (🗸) in front of the way of co	mmunication used in eac	h of the following items:
Items Light	Sound	Both light and sound
1. Car lamps.		
2. Television.		
3. Traffic lights.		
4. Radio.		

### **LESSON FOUR**

### **Activity 8 Transferring Information**

#### ▶ Put (√) or (x):

- 1. Fireflies communicate with each other through sounds.
- 2. Humans communicate with each other through language.
- Sense organs collect information about the world around us then send signals to the brain through nerves for processing and understanding.
- Human senses are used to gather information from the environment and communicate with others, where :
  - 1. Eyes detect light energy.
- 2. Ears detect sound energy.

#### Examples of information that the eyes receive :



Seeing the red traffic light means that you must stop.



People use a rescue flare to get help.



People use signal fires to communicate over distances of many kilometers.



Many hikers (travelers) use mirrors to attract the attention of rescue helicopters.

#### **Codes and transferring information:**

Humans use codes to transmit information.

#### Code:

It is a pattern that has meaning.

#### **Examples:**

- Thumbs-up or thumbs-down: can express simple meanings like good and bad.
- Traffic lights: can express simple meaning like stop and go.



 Expressions on faces: are codes that can help people predict our feelings such as happy, sad, angry ... etc.



 Language: is a code in the form of sounds, where different languages are different codes that are used to transfer information.



 Writing: is a code that uses symbols in a pattern to give a specific meaning according to the arrangement of letters in a word.



• Music or Sounds: are different sound tones produced from humans or musical instruments can be used in communication.



• Lighthouse: sends codes in the form of flashes of light that tell sailors where they are.



When sense organs receive this information and send messages to the brain, the brain decodes and interprets the meaning.

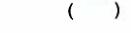


#### **Check** your understanding

#### ▶ Put (√) or (x):

1. Ears and eyes send signals to the brain through nerves for processing and understanding.

2. The code is a pattern that has meaning.



#### Review on Concept (1.3)

To review this concept look at the **Assessment Book** "Part 2: Final Revision".

In the Assessment Book:
Try to answer:

Self-Assessment (13)

Model Exam on Theme (1)

thumb express expressions predict الأبهام feelings الأبهام instruments التعبيرات lighthouse عنباً ليتوقع

interpret مشاعر sailors الألات / الأدوات فنار / منارة يحل شفرة

يفسر البحارة

# **Exercises on Lesson 4**

	<ul><li>Understand</li></ul>	O Apply	Higher Thinking Ski	ills
1	Choose the correct an	swer :		
•	All of the following and dov	re forms of codes, ex	<del></del>	(Ismailia 2022 <sub>)</sub>
	c. writing.		ces expressions. rimming.	
-	2. When your eyes see		is means that you have t	0
	a. increase your spe	ed. b. cro	oss the street.	
	c. keep your speed a			
	sense of		te with each other depen	ding on the
	a. hearing. b. s	-		
	understanding.	information and ser	nd signals to for pro	ocessing and (Port Said 2022)
	a. hands b. ie	•		,
İ	5. All the following signs	als are information th	nat the eyes receive, exc	ept
	<ul> <li>a. green traffic light.</li> </ul>		alarm.	<del></del>
	c. signal fires.	d. res	cue flare.	
	Choose from column (B	) what suits it in co	lumn (A) :	
	(A)		(B)	
-	1. Thumb-up	a. is a code that me	eans that you are in a da	nger.
	2. Thumb-down	b. is a code that me	eans that you say "Yes".	
		c. is a code that me	eans that you say "No".	
				,
	1		2	
	Put (✓) or (X):			7
	1. Animals communicate	with each other by	using different senses. (C	airo 2024)( \
2	2. Sense organs can dec	code the information	that is sent by the brain	( )
	3. Expressions on faces	are codes that can i	help people predict our fe	·
4	l. Different languages ha	ave similar codes.	1 1 Pro Product Out 10	/ /
			er distances of many kilor	meters. ( )

1. 2.	It is a type of codes which consists of symbols that gives a specific meaning according to arrangement of letters.	)
1.	omplete the following sentences:  Humans can communicate with each other where ears of human determinant energy and eyes of human detect	
	Give reasons for :	
1	. The symbols that are used in writing have a specific pattern.	
2	. People use face expressions during talking with each other.	
	The traffic light becomes red while you are going to cross the road.  Study the following figure, then put (	
	(2)	
	Flashlight Eye	Brain
	(1)	(5)
	<ol> <li>Number (5) represents the sense organ of light.</li> </ol>	(
2	2. Number (1) represents a source of light.	(
;	<ol> <li>Number (4) represents a special nerve through which the eye send information to the brain for processing it.</li> </ol>	ıs (
	<ol> <li>Number (2) represents a light ray that travels in straight line to enter the eye.</li> </ol>	er (
:	<ol> <li>Number (3) and (5) working together to collect and process differe sounds.</li> </ol>	nt (

## Model 1 Exam

### On Concept [1.3]

Total	mark
<del>-</del> 1	5

1 (A) Choose the correct answer:		(5 n	narks
1 can communicate by disp	laying light.		
a. All animals	b. All plants		
c. All plants and animals	d. Humans and some animals		
2. Each of human and fishing cat,			
a. has a mirror-like membrane ir	n their eyes.		
b. has an excellent night vision.	-		
c. has two eyes adapted for vision	on.		
d. becomes more active at night			
Which of the following community?	cations depends on the sense of sight		
a. Watching TV.	b. Flashing lights of fireflies.		
c. Echolocation.	d. Using the cell phone.		
4. Painted surfacethe incom	ning light rays.		
a. absorbs only	b. reflects only		
c. absorbs and reflects	d. allows to pass		
(B) Give a reason for the following	<b>*</b> •		
You can see an object placed be			
		•••••	•••••
		••••••	
(A) Put (✓) or (X):		(5 ma	arks)
1. Transparent objects don't allow I	ight to pass through them.	(	)
2. Human has huge eyes like fishing	cat to gather and reflect any light available	e. (	)
3. Nocturnal animals have bigger e		( (	, )
	ell as in bright light if his eyes contain	'	,
a mirror-like membrane.	on do in bright light if this eyes contain	,	,
		(	,
(B) What happens if?			
Light falls on a rough surface.			
••••••		•••••	

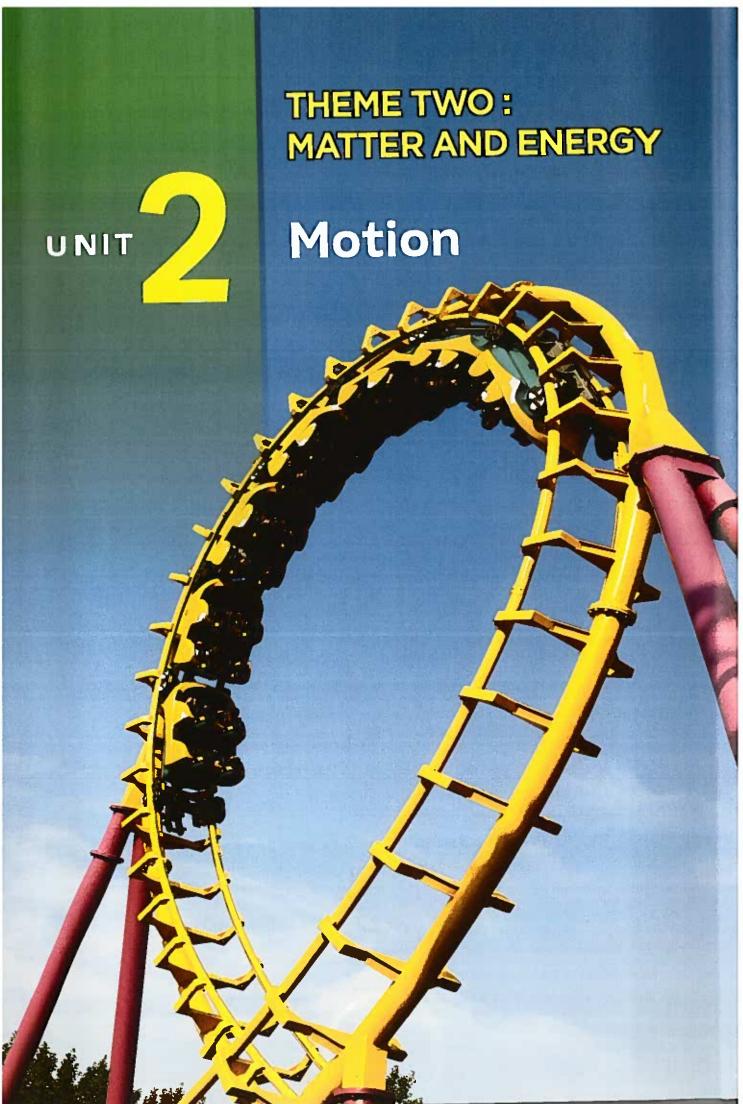
(A) Complete the following sentences :	, _ ,	mar no,
The is the main control center in humans and animals bodies are considered the organ of sight in their bodies.	s, while .	*********
2. Fishing cats depend on the sense of in weak light levels, who complete darkness they depend on the senses of and		
3. In the eyes of animals, there is a mirror-like membrane that	; lig	ht.
4. Paper and a piece of cloth are considered surfaces that diff energy.	use or sc	atter
(B) Cross out the odd word:		
1. Fire - Candle - The moon.	(	)
2. Flashlight - The moon - Mirror.	(	)

## Model 2 Exam

### On Concept [1.3]



<ul><li>3. Reading and writing</li><li>a. plants</li><li>b. h</li><li>4. Sense organs collegunderstanding.</li></ul>	embrane of the ach. Inch lines in the curved are commonumans	b. at the back of d. at the back of form of waves. c. zigzag types of commuc. animals and send signals	the eve.	
(B) Give a reason for The fishing cat's e	the following	<b>:</b>	a. Harido	
<ol> <li>(A) Complete the fol</li> <li>Human can see ob</li> <li>Smooth materials is which they strike the</li> <li>A group of firefly be of another group to</li> <li>Ears of humans de</li> <li>(B) What happens if .</li> <li>The mirror-like mer</li> </ol>	jects which givereflect light ray ne object. eetles can chat communicate etect ene	e off their own lights in directions of their own	to match the flash	at pattern
(A) Put (V) or (X):  1. Cats have excellen 2. Mirror reflects most 3. Different languages 4. A cell phone is a de	t of incoming li s have similar o	ght rays that fall codes.	on it.	(5 marks) ( ) ( ) ( )
(B) Write the scientifi  1. Materials that allow  2. The sense organ of	light to pass t	of the following hrough.		)



# **Get Started**

### What I Already Know



- All objects need energy to start or to stop motion.
- The opposite image shows a person in a wheelchair, where :
  - This person needs a small amount of force and energy to push the wheels of the chair to move down the ramp.
  - But, if this person needs to move up the ramp, so this person needs a larger amount of force and energy to push the wheels.



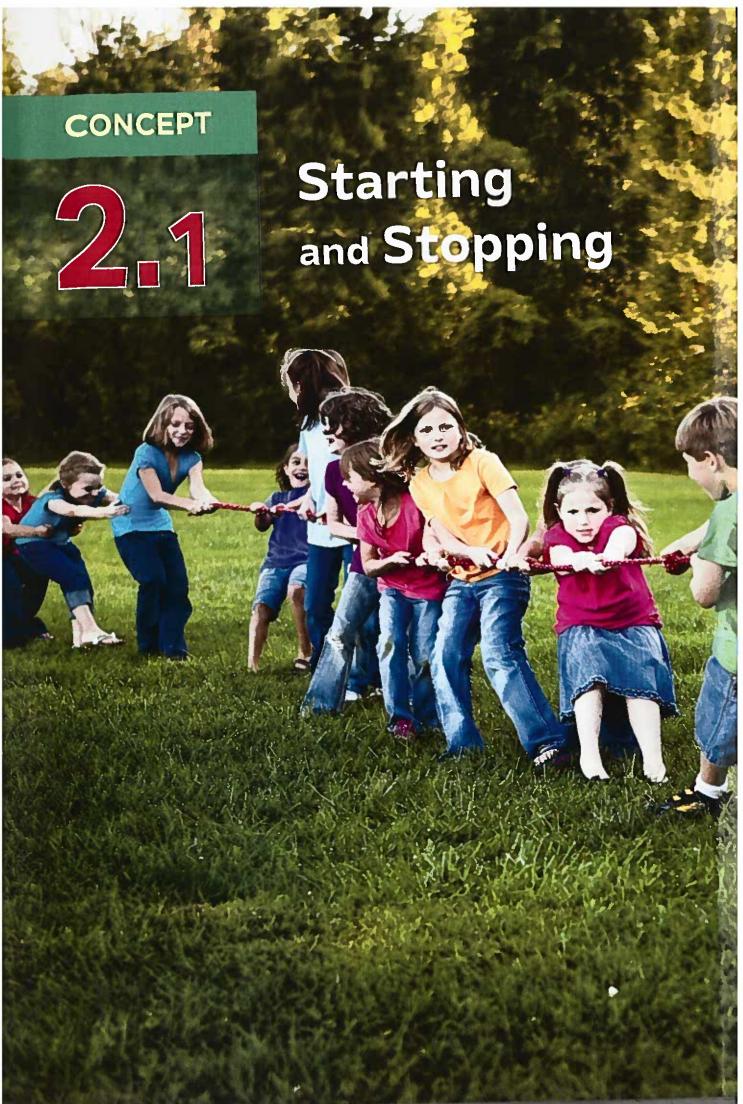
#### In this unit, you are going to study :

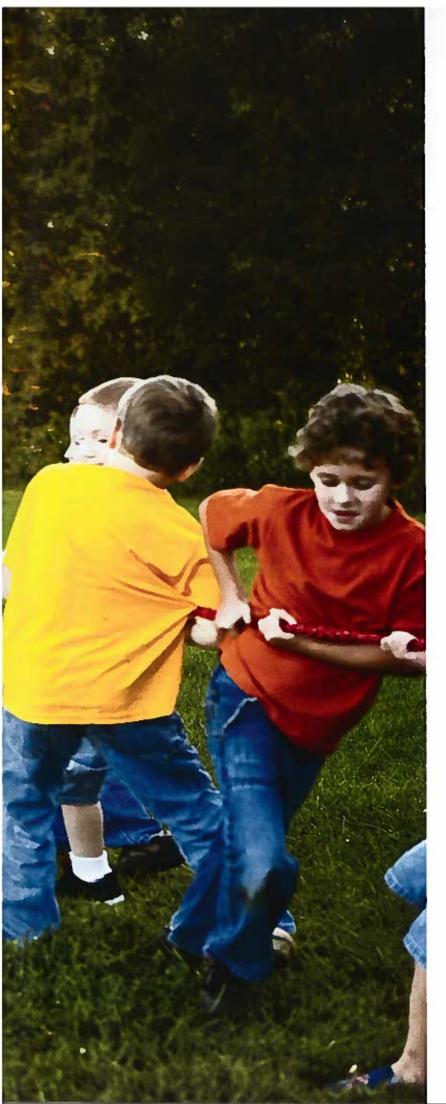
- How energy and motion are related.
- How energy changes when a force affects an object.
- The relationship between energy and work.
- How to observe and calculate the speed of a moving object.
- What happens when objects collide or crash together?

#### • Unit project : Vehicle safety :

- Cars have a lot of safety features to keep the driver and passengers safe during crashes such as seatbelts and airbags.
- At the end of this unit, you are going to make a research project about one of the safety features in cars and create a plan to improve this safety features.







### Learning outcomes

## By the end of this concept, your child will be able to:

- Explain and model what causes objects to change motion.
- Analyze data to explain different causes of changes in an object's motion.
- Cite evidence to show how speed is related to energy for an object.
- Model the cause and effect relationship between the force acting on an object and the object's motion.

#### Key vocabulary

- Energy
- Gravity
- Force
- Motion
- Friction
- Work

# Notes For Parents

### On Concept [2.1]

Lessons	Activities	What you should do with your child
	Activity 1	Discuss with your child some examples that need pushing or pulling forces.
1	Activity 2	Explain to your child the meaning of the "jet engine" and also help him/her to read more about the "the Shockwave truck".
	Activity 3	Discuss with your child how the air provides force to move some objects.
	Activity 4	Explain to your child the effect of balanced forces and unbalanced forces in our daily life.
2	Activity 5	Discuss with your child the meaning of "gravity" and its effect on all objects on the Earth's surface.
	Activity 6	Explain to your child the meaning of "force" and its effect in our daily life.
2	Activity 7	Explain to your child the meaning of "friction force" and also let him/her mention some examples of friction force.
3	Activity 8	Discuss with your child the relation between the amount of force acts on an object and the distance covered by this object.
	Discuss with your child the relation between energy, work and force.	
4	Activity 10	Help your child to think like a scientist by answering a question about one of the main points of this concept, then write his/her claim, evidence and scientific explanation.

### **LESSON ONE**

### **Activity 1 Can You Explain?**



### Did you think about how each of the objects above start to move?

- The objects above require forces to be acted on them to stop or move.
   These forces could be pushing forces or pulling forces.
- To move or to stop an object, the forces acting on this object must change.
- We need energy to apply these forces to the objects, where :
  - The person in picture 10 needs energy to push the car.
  - The person in picture 2 needs energy to pull the suitcase.
  - The football player in picture 3 needs energy to push the ball, while the goalkeeper needs energy to push against the ball to stop it.

#### In this concept, we will study :

- How forces act on different objects to move or stop them.
- The meaning of force.
- The relationship between energy, work and force.

force goalkeeper acting on pushing force قوة

against حارس مرمی require یؤٹر علی pulling force قوة الدفع suitcase تتطلب energy قوة السحب حقيبة سفر

طاقة

### Activity 2 Truck Versus Airplane

### ▶ Look at the following pictures, then put ( $\checkmark$ ) or (X):

An airplane can move faster than a truck.





Truck

Airplane

#### Truck versus jet airplane:

In the pictures above, the engines on a jet airplane are much more powerful than the engine in a truck.

So, jet airplanes fly much faster than moving trucks.

#### The Shockwave truck:

- The truck in the opposite picture is called "the Shockwave".
- The Shockwave truck contains three jet engines.



The Shockwave truck

#### How does the Shockwave move?

- The three jet engines make the Shockwave truck reach speeds more than 500 kilometers per hour.
- The Shockwave is about five times faster than the normal trucks.

## How does the Shockwave stop?

- To stop the Shockwave that moves with high speeds, engineers install three parachutes in it, that the driver opens them to help slow down the Shockwave quickly.
- The idea of parachutes is used in rocket designs.





#### Check your understanding

Complete the following sentences using the words below:

#### (faster than - slower than)

- that of a jet airplane. 1. The speed of a normal truck is ....
- 2. The speed of the Shockwave truck is \_\_\_\_\_ that of a normal truck.

### **Activity 3 Making Things Move**

All objects around us cannot move without push and pull forces, where:



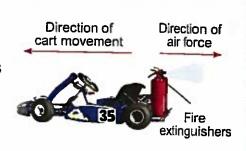
A ball lying on the ground does not move until someone pushes it with his foot to make the ball roll.



A closed drawer does not open until someone pulls the handle with his hand to open the drawer.

#### Air force :

- Air can provide enough force to move some objects such as : The wind blowing that can move the leaves of a tree.
- Let's see how engineers prove that the force of air can move some objects like "a cart".
  - Some engineers fix fire extinguishers onto a cart.
  - When they release air from the fire extinguishers, the air moves backward that makes the cart begins to move forward.
  - By increasing the number of fire extinguishers, the speed of the cart increases and the distance that it moves increases too and vice versa.



A cart with fire extinguishers

#### Check your understanding

#### Put (√) or (x):

- 1. Objects can move due to the effect of push or pull forces.
- 2. Air has a force that can move some objects.

In the Assessment Book:

Try to answer: Self-Assessment (14)

roll handle leaves

provide يدحرج wind blowing مقبض fix أوراق الأشجار

fire extinguisher بمد vice versa هيوب الرياح cart

release طفایه حریق distance العكس صحيح enough عربة صغيرة

اطلاق مسافة

# **Exercises on Lesson 1**

	<ul><li>Understand</li></ul>	Apply	mgn	of Hilliania States	
	hoose the correct answer:				
T L	Push or pull actions are cons	idered as typ	es of	(Giza 2023 / Ale	x. 2022)
Ĭ ''	a. force. b. device.	c. ene	rgy.	d. adaptation.	
2	When you kick a ball, it move				
	a. pulling force only.		hing force		
	c. pushing and pulling forces	d. sou	nd energy	only.	
• 3	When you move something a		u, this repr	esents	
	a. pushing force. b. light ene		ing force.	d. sound energy.	
• 4	. When you move something t		his represe	nts	
	a. pushing force. b. light ene	_	ling force.	d. sound energy.	
				(Cairo 2023 / Ca	iro 2022)
• 5	. The speed of a normal truck	is more than	that of	••••	
	a. a jet airplane only.			and a rocket.	
	c. a rocket and a bicycle.		icycle only		
6	. Parachutes are used in the				
	a. increase its speed.		crease its		
	c. keep its speed as it is.	d. <b>c</b> h	ange its dir	rection.	
7	'. In the Shockwave truck, the				
	a. don't affect its speed.		crease its		
	c. stop its motion.		crease its s		
<b>\</b> 8	3. By increasing the number o	f fire extingu	ishers fixed	I to a cart, its speed.	•••••
	a. increases.	b. <b>d</b> e	ecreases.		
	c. doesn't change.		ecomes zer		
• 6	9. All the following motions oc	cur by the ef	fect of pulli	ng force, except	
	a. kicking a ball.	-		osed drawer.	airo 2022,
	c. wearing your socks.			ag from the ground.	
1	O. The of the air that co of a cart forward.				/ement
	a. pulling force b. light en	ergy c. p	ushing forc	e d. sound energy	
2	Put (✓) or (X):	(1.00° 0000			
	1. To open or close a door, w	e have to pu	sh or pull it		(
	2. Putting on a pair of socks i				(
	<del>-</del>				

3. You need energy to push a car forward or backward.
4. A car can move faster than a bicycle.
5. A normal truck can move faster than a jet airplane. (Suez 2024) (
6. The three jet engines in the Shockwave truck allow it to fly.
7. A normal truck is slower than the Shockwave truck.
8. Parachutes are used to slow down the speed of the Shockwave truck quickly.
9. When the air is released backward from the fire extinguishers fixed to a cart, the cart moves backward.
10. By decreasing the number of fire extinguishers fixed to a cart, the speed of the cart increases.
11. Using a remote control of a television needs a pushing force to act on its buttons.
12. By increasing the speed of a moving cart, the distance that it moves will decrease.
Write the scientific term of each of the following :
1 A force that you make to use
2. A force that you make to move an object toward you. (
3. One of the fastest and most powerful trucks in the world.
Complete the following sentences :
1. The car can move or stop depending on the change of acting on it.
2. To move anything from one place to another, you need toit orit.
3. In the Shockwave truck, engineers put three in it to increase its speed, and they installed three to stop it.
4. The idea of stopping the Shockwave truck is the same idea of stopping a moving
5. Engineers use to slow down the motion of the truck and rockets.
6. The wind can move small things like of a tree, so engineers use this idea in moving a cart by fixing onto it.
7. If we put more than one fire extinguisher to a cart, so the of this cart will increase.
Give reasons for :
The Shockwave truck is faster than the normal truck.

2. Engineers use parachutes in the Shockv	vave truck designs.
3. When you kick a ball laying on the groun	nd, it moves.
What happens if?  1. You kick a stopped ball on the ground.	
Engineers placed jet engines inside a ne	ormal truck instead of its normal engine.
3. The Shockwave driver opens the parac	nutes.
Look at the following pictures, then com	plete the following sentences:
	Picture (2): Jet airplane
Picture (1): Normal truck  1. The engine of picture () is much pe	,u
When the engines of picture () are into the Shockwave truck.	
3. The engines that are used in picture ( in the Shockwave truck.	) are the same engines that are used
8 Look at the opposite figure, then answer	
<ul> <li>1. In the opposite figure what happens if the number of fire extinguishers fixed</li> </ul>	to the cart.
2. Put (✓) or (X):	
1. The air released by fire extinguishe moves forward.	rs moves backward, so the cart (  ire extinguishers, the cart moves for

a longer distance.

### **LESSON TWO**

# Activity 4 What Do You Already Know About Starting and Stopping?

#### Put (√) or (x):

A ball will not move if you push it with your foot.

#### How do objects move?

There are two forces that cause objects to move which are:

Pushing force	Pulling force
Example :	Example :
A man pushes a wheelbarrow.	A child pulls a toy car.

### The relation between motion with balanced and unbalanced forces:

#### **Balanced forces Unbalanced forces** - If there are balanced forces act on an - If there are unbalanced forces act on an object, so this object will not move. object, so this object will move. Example: Example: - In the tug-of-war game, if the two - In the tug-of-war game, if one team is teams are pulling the rope with pulling the rope with a greater force. equal forces. - So, the rope will move toward the team - So, the rope will not move. with the greater force. - This means that, the forces that act - This means that, the forces that act on on rope are balanced (equal) forces. the rope are unbalanced (unequal) forces.

#### Check your understanding

- ▶ Put (√) or (×):
  - 1. If an object moves, it means that the forces acting on it are balanced.
  - 2. The unbalanced forces cause objects to move.
- ▶ Complete the sentence below each picture, using the words "pushing" or "pulling":



1. The player uses the force to hit the ball.



2. The man uses the force to move his suitcase.



3. Children use the \_\_\_\_\_ force in tug-of-war game.



4. The boy uses the \_\_\_\_\_force to move his skating board.

### **Activity 5 Objects in Motion**

#### How do we know an object is moving?

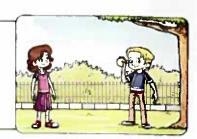
- An object is in motion if its position changes from one place to another, even if this change can't be seen.
- The change in position of an object is compared to something else that is not usually moving (fixed point).

#### Motion:

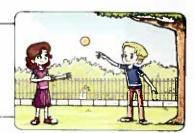
It is any change in the position of an object relative to a fixed starting point.

#### Example of an object motion :

The boy holding a ball in starting position which is close to the tree.



When he throws the ball, it will move by the pushing force through the air.



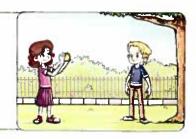
Then the ball will drop into the hand of the girl by the pulling force of gravity.

#### **Gravity:**

It is the force that pulls objects down toward the Earth.



- The ball will stop by the pushing force of the hand of the girl against the ball movement.
- The position of the ball changes, relative to the tree which is the fixed starting point.



#### Some motion are easy to be seen, such as:

A person walks down the street.

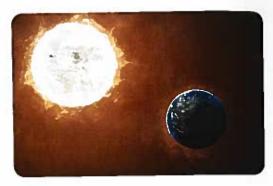


Leaves move by the wind blowing.



Some motion are hard to be seen, such as :

The rotation of the Earth around the Sun.



### Check your understanding

▶ Complete the following sentences using the words below :

(pull - position - gravity - motion)

- 1. A force must act on a ball to start motion, so the \_\_\_\_\_ of the ball will change.
- There are two types of force which are a push force and a \_\_\_\_\_ force that cause the \_\_\_\_\_ of any object.
- 3. The force that pulls objects down toward the Earth is known as



#### What makes objects move?

Any object needs a force to move and change its position.

#### Force:

It is a push or pull that is applied to an object causes it to change its position.

### ▶ What are the forces that affect the bag when you lift it?

- The force of the gravity pulls your bag downward.
- The force of your arm pulls your bag upward.
- The pulling force of your arm is greater than the pulling force of the gravity (two unbalanced forces).
   So, the bag moves up toward the greater force.





To move up any object from the ground, the pulling force of your arm must be greater than the pulling force of the gravity.

### Is there any force affects objects when they are not in motion?

#### 1. When you sit on a chair:

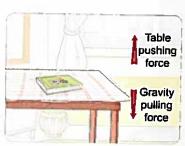
- The force of the gravity pulls you downward.
- The chair exerts force that pushes your body upward.
- The pulling force of the gravity is equal to the pushing force of the chair (two balanced forces).

So, there is no motion due to the two balanced forces that hold you in the chair.

#### 2. When a book is put on a table :

- The force of the gravity pulls the book downward.
- The table exerts force that pushes the book upward.
- The pulling force of the gravity is equal to the pushing force of the table (two balanced forces).

So, there is no motion due to the two balanced forces that affect the book.

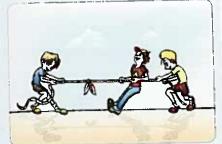




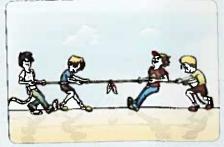
pulling force

### Check your understanding

Look at the following pictures, then answer the questions below:







Picture (1)

Picture (2)

Picture (3)

#### 1. Choose:

In this game when the rope moves, it moves toward the team with \_\_\_\_\_\_ force (greater – smaller).

- 2. Complete the sentences by writing if the forces are "balanced" or "unbalanced":
  - a. The forces in picture (1) are
  - b. The forces in picture (2) are
  - c. The forces in picture (3) are

In the Assessment Book:
Try to answer:
Self-Assessment 15

# **Exercises on Lesson 2**

Understand

O Apply

Higher Thinking Skills

Choose the correct answer:		
1. All objects around us can move	by the effect of	
a. pushing force only.		
c. pushing and pulling forces.	d. sound and light energies.	
2. A ball may move away from the		ect of
a. pushing force only.	b. pulling force only.	
c. pushing and pulling forces.		
3. When an object is in motion, this	means that its changes. (Cairo	2023 / Cairo 2022
	c. size d. position	
4. When you sit on a chair, the force chair.		ou in the
a. pulling you upward.	b. pulling you downward.	
c. pushing you upward.	d. pushing you downward.	(Cairo 2022)
5. What makes a ball in the air fall		
a. Friction force.	b. Gravity force.	
c. Sound energy.	d. Light energy.	
6. Which of the following will cause	an object to move ?	
a. Balanced forces.	b. Unbalanced forces.	
c. Sound energy.	d. Light energy.	(Luxor 2022)
7. In the tug-of-war game, two tean		
a. pull the rope in the same direct		
b. push the rope in the same dire		
c. pull the rope in opposite direct		
d. push the rope in opposite direct		
8. In the tug-of-war game, when two	o teams are pulling a rope, and th	e rope
does not move toward any team,	this means that	
a. equal forces are being applied	on the rope in the same direction	<b>).</b>
b. equal forces are being applied	on the rope in opposite directions	6.
c. unequal forces are being applied.	ed on the rope in the same directi	on.
d. unequal forces are being appli-	eu on the rope in opposite direction	ons.

<ul> <li>a. a running person.</li> <li>b. a ball travelling through the air.</li> <li>c. a flying bird.</li> <li>d. a sleeping dog.</li> <li>11. Two equal forces act at the same time on a stopping object but in opposit directions. Which sentence describes the object's state?</li></ul>	ro 2024 t <b>e</b>	
d. The object speed increases.	nt	
12. You can see the movement of the following objects, except the moveme	za 202:	3)
Of		
the planet Earth		
Water El Cha	ikh 202:	2)
13. Gravity is a force that		
a. pushes objects down toward the Earth. b. pulls objects down toward the Earth.		
c. pushes objects toward the sky.		
d. pulls objects toward the sky.		
d. pulis objects toward the Diff.		wed?
2 Put (✓) or (X):		Ļ
1. The stopping object can't move until a force acts on it. (Cairo 2023 / Minia 20	22) (	)
2. The rotation of the Earth around the Sun is easy to be seen.	(	)
3. Unbalanced forces keep an object in its place without moving. (Cairo 20	24) (	)
4. If the two teams in the tug-of-war game are pulling the rope with equal t	orces,	
the rope will move toward one of the two teams.	(	)
5. Unbalanced forces cause a change in the object position. (Minia 20	24) (	)
6. If one team in the tug-of-war game pulls the rope with a greater force,		
the rope will move toward the team with the smaller force.	(	)
Write the scientific term of each of the following:		
1. It is a push or pull that is applied to an object causes it to change its po	sition.	
(Cairo 2022) (		)

0	2	The force you can do to move an object away from you.
		(El-Menoufia 2024) ()
ļ	3.	The force you can do to bring an object closer to you. ()
•	4.	A change in the position of an object relative to a fixed starting point. ()
-	5.	The force that pulls objects down toward the Earth. (El-Behira 2024) ()
4	C	omplete the following sentences :
-	1.	As you are sitting down on a chair, there are two forces that act on your body which are the force of gravity and the force of the chair.
d	2.	The toy placed on a table does not move due to the effect of the two balanced acting on it.
	3.	In the tug-of-war game, the force of the stronger team makes the rope moves toward this team.
0	4.	When you throw a ball up in the air, it starts to fall down again toward the ground due to the effect of pulling force of
	5.	When you lift up an object from the ground, there are two forces act on it, which are the force of your hand and force of the gravity.
	6.	You can stop a moving basketball by the force of your hand against the ball movement.
	7.	The train's position changes relative to the train station. This sentence describes the meaning of
	8.	A chair stands on the floor due to the pulling force of
0	9.	If you throw a ball through the air, it is affected by the force of your hand and the force of the Earth's gravity.
-	10.	We can say that the object is in motion when it changes its position relative to a starting point.
5	C	orrect the underlined words :
•	1.	Moving an object away from you represents a pulling force.
		(Cairo 2024) ()
	2.	Moving an object toward you represents a pushing force. ()
ľ		The balanced forces cause the object to move. (Giza 2023/Gharbia 2022) ()
ļ		When you jump up, the force of friction pulls you back to the ground. ()
		Changing the position of an object relative to a fixed point
		is known as force. ()
	6.	The rope in the tug-of-war game may not move toward any team, if both teams
		<u>push</u> with the same force. ()

#### **6** Give reasons for :

	When two equal pushing forces act on an object in opposite directions, the object doesn't move.
7	2. If you let a pen out of your hand, it falls to the ground.
	3. When your friend catches a ball that is thrown in the air, the motion of the ball is stopped.
<u> </u>	What happens if?
	The pulling forces of the two teams are equal in the tug-of-war game.
	2. You let your toy out of your hand.

Look at the following pictures, then choose if the forces are "Balanced" or "Unbalanced":



1. A book on a table (Balanced – Unbalanced)



2. A seesaw (Balanced – Unbalanced)

### Write the type of force that is used in each of the following situations:









### 10 Look at the following picture, then choose the correct answer:



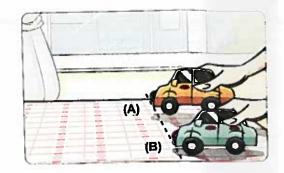
- 1. Among the forces that act on the basketball in this picture are .....
  - a. pushing force of both gravity and the player's hand.
  - b. pulling force of both gravity and the player's hand.
  - c. pushing force of gravity and pulling force of the player's hand.
  - d. pulling force of gravity and pushing force of the player's hand.
- 2. The basketball will fall down to the ground due to the ..... that acts on it.
  - a. pushing force of gravity b. pulling force of gravity

- c. friction force of air
- d. friction force of ground

### **LESSON THREE**

### **Activity 7 Stopping Motion**

- ► Look at the opposite figure, then choose the correct answer:
  - If we push the two cars with two different forces, where car (B) is pushed with a force greater than car (A).



#### How does an object in motion stop?

A moving object only stops when a force of the same amount is applied to it in the opposite direction of its motion.

The force that stops a moving object may be:

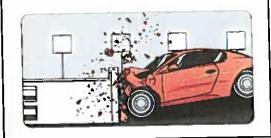
# Example :

### When a car crashes into a wall,

it stops.

Because the wall applies

 a force to the car with the
 same amount of the force that
 pushes the car toward the wall.



#### Hard to be observed

#### Example:

- When a car runs out of fuel on a flat road, its speed decreases gradually until it stops.
- Because there is a friction force comes from :
  - 1. Friction (rub) between the car tires and the road.
  - 2. Friction between the air that flows over the car against its surface.



#### Friction:

It is a force that is exerted when objects rub against each other.

#### **Notes**

- 1. Friction force always slows down or stops motion of moving objects.
- 2. The direction of friction force is always opposite to the direction of motion of a moving object.

### Check your understanding

- ► Complete the following sentences using the words below : (friction opposes unbalanced)
  - 1. Any object moves from its place when the forces acting on it are
  - 2. The force that slows down or stops motion is called
  - 3. Friction is a force that the motion direction.

### **Activity 8 Rolling Cars**

 You have learned about the causes of motion, in this activity you will explore the effect of applying different amounts of force to an object.





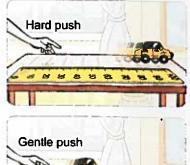
Toy car

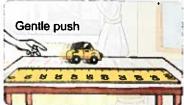


Measuring ruler

#### Steps

- Push the toy car hard from a starting point, and record the distance the toy car travels by using the measuring ruler.
- 2. Repeat the above step several times, and record the data in a table, then find the average distance.
- 3. Push the toy car very gently from the same starting point, and record the distance the toy car travels.
- Repeat step (3) several times, and record the data in another table, then find the average distance.





#### **Observations**

 The car moves a large distance when it is pushed hard as shown in the following table:

Distance (cm)
90 cm
75 cm
80 cm
95 cm
listance =
+ 95 

 The car moves a small distance when it is pushed gently as shown in the following table:

Ge	ntle push
Trial	Distance (cm)
1	14 cm
2	17 cm
3	20 cm
4	17 cm
The averag 14 + 17 + :	e distance = 20 + 17
4	= 17 cm

explore several times repeat average distance يكنشف gently عدة مراث trial إعادة hard push متوسط المسافة

gentle push برقة data دفعة قوية record دفعة خفيفة بيانات بسجل

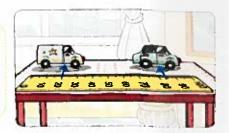
#### Conclusions

- Hard push causes object to travel a long distance.
- Gentle push causes object to travel a small distance.

#### Note

#### If the same force acts on a toy car and a toy truck:

- The car (the smaller object) will travel a farther distance.
- The truck (the bigger object) will travel a shorter distance.





#### **Check** your understanding

- ▶ Put (√) or (x):
  - 1. A toy car travels a very small distance when it is pushed hard. ( )
  - 2. When we push a toy car and a toy truck with the same force, the toy car will move faster.

In the Assessment Book:
Try to answer:

Self-Assessment (16)

# **Exercises on Lesson 3**

	<ul> <li>Understand</li> </ul>	O Apply	<ul><li>Higher Thinking Skills</li></ul>		
1	Choose the correct answe	r:			
Ī	1. The force that occurs wh	en an object rubs a	gainst another object is called	<u>.</u>	
	a. friction. b. grav		and the same of th	inia 2022	
	<ul><li>2. The force that tries to ste</li><li>a. gravity.</li><li>c. push.</li></ul>	op an object moving b. frictio d. pull.		airo 2024	1
ļ		Ť	and the road that acts to dec		")
	car's speed gradually.  a. gravity	b. pullin	(Cairo 2023 / Daka <b>l</b> g		2)
	c. pushing	d. frictio	n		
•	<ul> <li>4. Which of the following s</li> <li>a. It pulls objects toward</li> <li>b. It pushes objects awa</li> <li>c. It slows down or stops</li> <li>d. It doesn't affect object</li> </ul>	the ground.  by from the ground.  cobjects in motion.	the friction force ?		
	<ul><li>5. When an apple falls from a. friction force of air on b. gravity pulling force oc. gravity pushing force d. friction of air and grav</li></ul>	ly. nly. only.	ground, it is affected by		
	6. Tamer pushes a ball on	a flat ground and it o	covers a distance of 30 cm. If	he	
	pushes it with more force	e, it may cover a dis	tance equal to cm.		
	a. 5 b. 15	c. 30	d. 50		
2	Put (✓) or (X) :				
I	1. When a car crashes into	a wall, it will not st	op. (Alex. 202	23) (	)
ļ	2. Sometimes it is easy to	•	•	(	)
ŀ	· ·		s speed increases gradually		•
	until it stops.	·	(Sharkia 202		)
÷	4. Friction force always slo	ws down or stops t	he motion of moving objects.	(	)
ŧ	5. The motion of an object	on the ground is af	fected by a friction force.	(	)
•	6. Hard push causes an ol	oject to travel for a l	onger distance.	(	)
-		<del>-</del>	cts so, the bigger object will		
	travel for a longer distar			(	)
1	8. A football rolls on the gravestops the ball is the gravestops.		then it stops. The force which	1 (	)

Write the scientific term of each of the following:  1. It is a force that is exerted when objects rub against each other. (	2	Correct the underlined words:  1. Moving object stops when a force of the same amount is applied to it in the same direction of its motion.  2. If a car runs out of fuel, its speed increases.  3. The motion of a car is opposed by the gravity of air.	() ()
Complete the following sentences:  1. A moving car is affected by the	<b>?</b> 1	<ul><li>It is a force that is exerted when objects rub against each other.</li><li>It is a force that slows down the motion of moving objects.</li></ul>	
1. When your toy car crashes into a wall, it will stop moving.  2. When you stop pedalling during the movement of your bicycle, it slows down until it stops.  3. If you push two similar toy cars on the same ground, one of them may travel for a longer distance than the other.  4. If the same force acts on a small car and a truck, the small car will travel for	3 4 5.	Complete the following sentences:  A moving car is affected by the	nich act in ne train is ne small ball ing force it stops due
3. If you push two similar toy cars on the same ground, one of them may travel for a longer distance than the other.  4. If the same force acts on a small car and a truck, the small car will travel for	1.	When your toy car crashes into a wall, it will stop moving.  When you stop pedalling during the movement of your bicycle, it slow	***************************************
	4.	If you push two similar toy cars on the same ground, one of them ma a longer distance than the other.  If the same force acts on a small car and a truck, the small car will train	y travel for

1. A car runs out of fuel on a flat road.  2. You push two similar balls with different forces on the ground.  The following figure shows two similar toy cars are pushed to move on the same floor, study the figure then answer the questions below:  1. Which of these two cars is affected by a greater force?  (Cairo 2022)  (Give a reason for your answer).  70 cm  8  2. Choose the correct answer:  1. If the two cars were pushed by the same force, so a. car (A) would move for a longer distance than car (B).  b. car (B) would move for a longer distance than car (A).  c. the two cars would move the same distance.  d. the two cars would not move.  2. If you replace car (A) with a new car which is larger than car (B), the new	Vhat happens if?	
The following figure shows two similar toy cars are pushed to move on the same floor, study the figure then answer the questions below:  1. Which of these two cars is affected Original position by a greater force? (Cairo 2022) (Give a reason for your answer).  2. Choose the correct answer:  1. If the two cars were pushed by the same force, so	. A car runs out of fuel on a flat road.	
<ul> <li>same floor, study the figure then answer the questions below:</li> <li>1. Which of these two cars is affected by a greater force? (Cairo 2022) (Give a reason for your answer).  70 cm  8  2. Choose the correct answer:  1. If the two cars were pushed by the same force, so</li></ul>	. You push two similar balls with differ	ent forces on the ground.
by a greater force?  (Give a reason for your answer).  70 cm  8  2. Choose the correct answer:  1. If the two cars were pushed by the same force, so		
(Give a reason for your answer).  70 cm  8  2. Choose the correct answer:  1. If the two cars were pushed by the same force, so	1. Which of these two cars is affected	Original
2. Choose the correct answer:  1. If the two cars were pushed by the same force, so	by a greater force ? (Cal	
<ol> <li>If the two cars were pushed by the same force, so</li></ol>	(Give a reason for your answer).	70 cm ———————————————————————————————————
<ul> <li>a. car (A) would move for a longer distance than car (B).</li> <li>b. car (B) would move for a longer distance than car (A).</li> <li>c. the two cars would move the same distance.</li> <li>d. the two cars would not move.</li> <li>2. If you replace car (A) with a new car which is larger than car (B), the new</li> </ul>	<del></del>	he same force. so
<ul> <li>b. car (B) would move for a longer distance than car (A).</li> <li>c. the two cars would move the same distance.</li> <li>d. the two cars would not move.</li> <li>2. If you replace car (A) with a new car which is larger than car (B), the new</li> </ul>		
<ul><li>c. the two cars would move the same distance.</li><li>d. the two cars would not move.</li><li>2. If you replace car (A) with a new car which is larger than car (B), the new</li></ul>		
<ul><li>d. the two cars would not move.</li><li>2. If you replace car (A) with a new car which is larger than car (B), the new</li></ul>		
2. If you replace car (A) with a new car which is larger than car (B), the new		
will move a distance the distance that covered by car (B).  a. longer than b. shorter than c. equal to d. twice	will move a distance the a. longer than	distance that covered by car (B). b. shorter than
3. The two cars during motion are affected by all the following forces, except	3. The two cars during motion are a	affected by all the following forces, except
a. the pushing force.  b. the friction force of the air.		
c. the friction force of the floor. d. the pushing gravity force.	·	d. the pushing gravity force.

# **LESSON FOUR**

## **Activity 9** Energy, Work and Force

► Look at the opposite picture, then choose the correct answer:

This man exerts a ..... force on the car to make it moves.

( pushing - pulling )



#### The relationship between energy, work and force:

#### Example:

- The man exerts a pushing force on the car to move it.
- So, this force transfers energy from his body to the car.
- VVhen he moves the car, this means that he is doing work.



#### From the previous example, we can conclude that:

- Force transfers energy from one object to another.
- The work done is equal to the amount of energy transferred by a force that is used to move an object.

Force Transfers Energy Enables us to do Work

#### Note

Force and energy are different, but they are related to one another, where force is the effect that changes energy and allows it to do work.

## Check your understanding

Complete the following sentences using the words below:

(force - work)

- 1. To make an object start or stop moving, this requires
- 2. When you push a car and it starts to move, you are doing

## Activity 10 Record Evidence Like A Scientist

- ▶ In this concept, you have learned a lot about the role of balanced and unbalanced forces in starting and stopping motion.
- Now, try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learned in the previous concepts.

How do forces act o	n different objects to mak	e them start moving and stop me	oving '
Step 2 My Clai	im		
Step 3 My Evi	dence		
***************************************			
Step 4 My Sci	entific Explanation		
***************************************			
***************************************			
***************************************			

role

evidence وظيفة / دور scientific explanation افتراض

To review this concept look at the Assessment Book

Model Exam on Concept (2.1)

Try to answer:

Self-Assessment (17)

"Part 2: Final Revision".

# **Exercises on Lesson 4**

	• Understan	d O Ap	ply • Higher	Thinking Skills	
1	Choose the correc	t answer :			
			move by a pushing fo	orce. except	
	a. a ball.		c. tug-of-war rop		
1 2	. To stop a moving	g object we can a	apply a against i	t.	
			c. sound energy		
<b>4</b> 3	. Samir pushed hi	is toy car that mo	oved forward, to stop it	the should	
		same moving dir			
			same moving direction		
			same moving directior to its moving direction		
• 4			nount of transfer		
	used to move ar		iount of transier	red by a force triat is	
	a. energy	b. friction	c. pushing	d. gravity	
7	Put (✓) or (X) :				
		es a table throug	h a distance, there is a	a work done.	
				(Gharbia 2024) (	)
			e energy than pushing		)
	is done.	ra door but you	cannot open it, this me	eans that work	١
4	. Hitting a tennis t	oall needs a pulli	ng force.	(Giza 20 <b>23) (</b>	j
3 0	Complete the follo	owing sentences	:		
		_	· on the floor, your push	ning force transfers	
		r body to the tabl		g tot oo trailololo	
2	. Any force applie	d to an object is	considered as the effe	ect that changes	
	and allows it to		•		
9	_		equal to the amount	of transferred	
1	iforn the blaver i	nand to the ball.			
1 4					
	. To stop the rollin			t aequal to tha	t
70 1.	. To stop the rollin exerted by the b	all in the opposit	e direction.		t —
	. To stop the rollinexerted by the bond the opposite figure	all in the opposit ure, which of th		t aequal to tha	t 
† m	. To stop the rollin exerted by the b	all in the opposit 	e direction.		t 
† m	. To stop the rolline exerted by the bonton the opposite figure.	all in the opposit jure, which of the the weights? your answer).	e direction.		t
† m	. To stop the rolline exerted by the bonton the opposite figure.	all in the opposit jure, which of the the weights? your answer).	e direction. e two players does		

# Model 1 Exam

# On Concept (2.1)

Tota	ıl ı	mark	
-	1:	— 5	

(A) Choose the correct answer:	(	5 mar	ks)
1. Mona throws her ball up in the a	air so, gravity will make the ball move		
a. forward. b. upward	. c. downward. d. back	ward	•
2. Which situation represents the tale. A car hits a tree and its motio b. A wind blows and a sailboat rc. A book is pushed to move acted. A person drops a ball that fall	on stops. moves. ross a table.		
3. The speed of the Shockwave tr	ruck is more than that of the		
a. normal truck only.	b. jet airplane only.		
c. normal truck and rocket.	d. rocket and jet airplane.		
4. All the following are examples of	of pushing force, except		
a. writing using a keyboard.	b. lifting a bag.		
c. kicking a ball.	d. throwing a basketball.		
o. Noning a ban.			
(B) What happens if?			
(B) What happens if?	ne rope of tug-of-war game are balanced.		
(B) What happens if?			oe). 
(B) What happens if?	ne rope of tug-of-war game are balanced.		
(B) What happens if?  The forces that are acting on the	ne rope of tug-of-war game are balanced.	e rop	
(B) What happens if?  The forces that are acting on the second secon	ne rope of tug-of-war game are balanced.	e rop	
(B) What happens if?  The forces that are acting on the second secon	ne rope of tug-of-war game are balanced.  (according to the movement of the	e rop	
<ul> <li>(B) What happens if? The forces that are acting on the forces. </li> <li>(A) Put (✓) or (X): <ol> <li>Gravity pulls objects upward.</li> </ol> </li> <li>The main difference between pof the force.</li> </ul>	ne rope of tug-of-war game are balanced.  (according to the movement of the	e rop	
<ul> <li>(B) What happens if? The forces that are acting on the forces. </li> <li>(A) Put (✓) or (X): <ol> <li>Gravity pulls objects upward.</li> </ol> </li> <li>The main difference between pof the force.</li> </ul>	ne rope of tug-of-war game are balanced.  (according to the movement of the balanced of the movement of the balanced of the balanced.	e rop	
<ul> <li>(B) What happens if? The forces that are acting on the forces that are acting on the force. </li> <li>(A) Put (✓) or (X): <ol> <li>Gravity pulls objects upward.</li> <li>The main difference between prof the force.</li> <li>We can't observe the movement.</li> </ol> </li> </ul>	ne rope of tug-of-war game are balanced.  (according to the movement of the balance of the movement of the balance of the bala	e rop	

3	(A) Correct the underlined words :	(5 marks)
	1. By increasing the pushing force acting on a moving toy car, it will move for a short distance.	ove ()
	2. Any moving object stops when a force of the same amount is applied on it in the same direction of its movement.	()
	3. To increase the speed of the Shockwave truck, engineers installed three parachutes in it.	()
	4. A table stays without any motion due to the <u>unbalanced</u> forces that are acting on it.	()

## (B) Look at the opposite picture, then complete the following sentences:

- 1. The person in this picture uses ...... to land safely.



# Model 2

## On Concept (2.1)

Total	mark
1	5

. When we put a jet engine in a normal truck, its speed will				
. When we put a jet engine in a normal truck, its speed will 2. The bicycle cannot move without a	A) Complete the following se	ntences:	(5 marks)	
2. The bicycle cannot move without a	. When we put a jet engine in	a normal truck, its speed will		
3. When you push a toy car on the ground, its speed decreases gradually until it stops due to the effect of	. The bicycle cannot move wit	thout a acting on it.		
1. To stop a moving toy truck on the ground, you need to exert a	3. When you push a toy car on	the ground, its speed decreases gradua	illy until it	
If a ball moves on the flat road, its speed decreases till it stops.  (A) Write the scientific term of each of the following:  (5 mark  (	I. To stop a moving toy truck o	n the ground, you need to exert a	equal to	
(A) Write the scientific term of each of the following:  1. The type of force that is used in tug-of-war game.  2. It is the force that causes any object falls down toward the ground.  3. It is the engine that is used in the Shockwave truck to allow it moves fast.  4. It is a force that is exerted when objects rub against each other.  (B) What happens if?  A car and a truck are affected by the same pushing force.  (A) Choose from column (B) what suits it in column (A):  (B) 4. Friction force  2. Balanced forces  3. Unbalanced forces  4. Gravity force  (B) Choose from column (B) what suits it in column (CE)  (CE) Choose from				
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<ul> <li>2. Balanced forces</li> <li>3. Unbalanced forces</li> <li>4. Gravity force</li> <li>b. is the force that act in the opposite direction of the object's movement to stop it.</li> <li>c. is the force that causes any object falls down toward the ground.</li> <li>d. are the forces that act on any object that does not move.</li> <li>e. is the force that act in the same direction of the object's movement to stop it.</li> </ul>		a. are the forces that act on any object	to make it	
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toward the ground.  d. are the forces that act on any object that does not move.  e. is the force that act in the same direction of the object's movement to stop it.	4. Gravity force	the object's movement to stop it.		
d. are the forces that act on any object that does not move.  e. is the force that act in the same direction of the object's movement to stop it.				
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3 4		toward the ground.  d. are the forces that act on any object not move.	that does	
		toward the ground.  d. are the forces that act on any object not move.  e. is the force that act in the same directions.	that does	

# (B) Look at the opposite picture that shows a boy moves a car forward, then complete the following sentences:

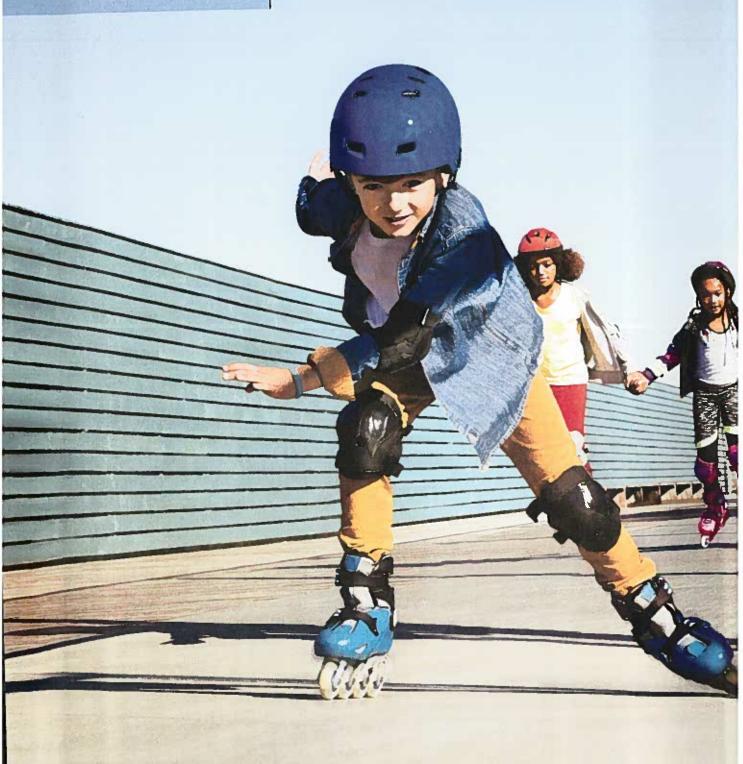
- 1. The car moves as a result of ...... force that is applied by the boy.
- During the movement of the car, it is opposed by the friction force of .......... and the friction force of the ground.

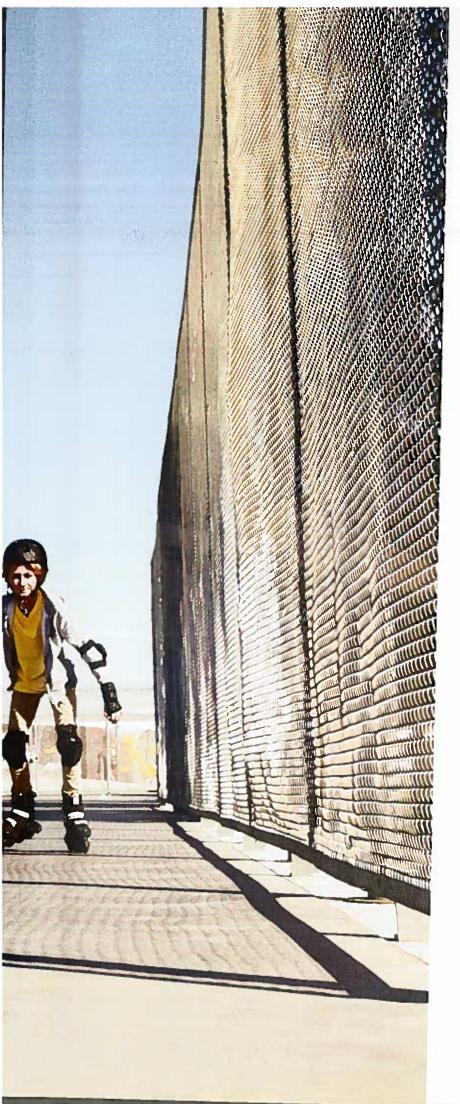


CONCEPT

2.2

# Energy and Motion





## Learning outcomes

# By the end of this concept, your child will be able to:

- Investigate the forms of energy in a system or for an object.
- Apply logical reasoning to predict the types of energy for an object.
- Cite evidence to explain how energy is conserved.

## **Key vocabulary**

- Kinetic energy
- Potential energy
- Chemical energy
- Gravitational potential energy
- Thermal energy

# Notes For Parents

# On Concept [2.2]

Lessons	Activities	What you should do with your child
		Let your child mention some examples of objects that have kinetic energy and potential energy.
1	Activity 2	Discuss with your child the different types of energy in the roller coaster during its movement.
	Activity 3	Discuss with your child the different forms of energy and let him/her mention some examples of each of them.
	Activity 4	Explain to your child the relationship between energy and work.
2	Activity 5	Explain to your child the meaning of "potential energy" and "kinetic energy".
3	Activity 6	<ul> <li>Explain to your child that all forms of energy are classified into two main groups which are potential energy and kinetic energy.</li> <li>Discuss with your child that potential energy depends on the mass of an object and its height from the Earth's surface.</li> </ul>
	Activity 7	Let your child mention the changes of energy in some devices.
	Activity 8	Explain to your child the concept of : "energy is not created or destroyed".
4	Activity 9	Help your child to think like a scientist by answering a question about one of the main points of this concept, then write his/her claim, evidence and scientific explanation.

# **LESSON ONE**

## **Activity 1 Can You Explain?**



## In the previous concept, you have learned that:

Objects need a force to move or stop and this force applied to objects needs energy to be able to do work, so how do moving objects get energy?

- The pictures above show:
- A sand surfer moves very fast down the sand hill in figure ①.
- The ball moves through the air when the player kicks it with his foot in figure ②.
- The toy car at the top of slope will not move if no force is applied to it in figure 3.

## From the previous observations, we can conclude that :

- All moving objects have a type of energy known as kinetic energy.
- Objects that do not move don't have kinetic energy but they have another type of energy known as potential energy that is stored in them. When these objects start to move, they get kinetic energy.

## In this concept, we will study:

- The meaning of energy and its basics.
- Types of energy.
- Kinetic energy and potential energy.

## **Activity 2 Roller Coasters**

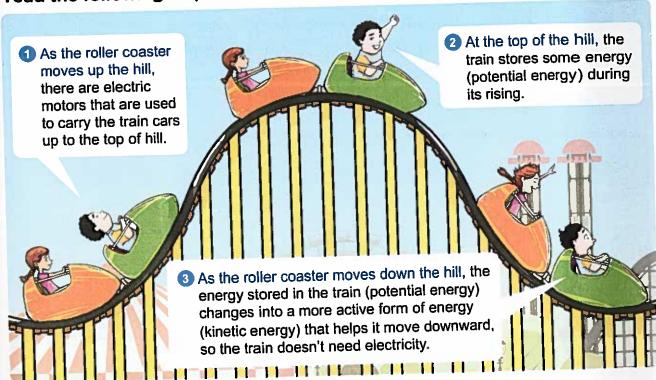
In your opinion, which of the following energies is responsible for the movement of the roller coaster (train)?

- a. Kinetic energy.
- b. Sound energy.
- c. Light energy.
- d. Thermal energy.



Roller coaster

- ▶ In the previous activity, you have learned that objects need energy to move. Now, let's study the motion of the "roller coaster" as an example to know the source of energy that makes it move.
  - First, the roller coaster moves up the hill (ramp) slowly and its speed decreases gradually until it reaches the highest point.
  - Then, the roller coaster pauses briefly at the top of the hill.
  - After that, the speed of the roller coaster increases as it moves down the hill.
  - To know the source of energy that makes the train move with this speed, read the following steps:



#### From the previous explanation, we can conclude that :

- When the roller coaster moves downward, its kinetic energy increases.
- The kinetic energy increases as the speed increases.

# What happens if ...?

- A roller coaster moves from up to down. (according to its energy).
   The stored potential energy in the train is changed into kinetic energy.
- A roller coaster stops. (according to its kinetic energy).
   Its kinetic energy becomes zero.

## Check your understanding

▶ Put (√) o	r (x):
-------------	--------

- 1. Kinetic energy of a moving object increases as its speed increases. (
- When a roller coaster moves from up to down, it has the most kinetic energy when it reaches the lowest point of the hill.
- 3. When the roller coaster moves downward, its kinetic energy decreases. (

# Activity 3 What Do You Already Know About Energy and Motion?

- From the previous activities, you can conclude that we need energy to do all our daily activities such as running, walking and even during reading a book.
  So, energy is part of everything that happens in the world and everything we do.
- ▶ Examples show the importance of energy in our life :
  - Energy that we obtain from eating food helps us grow and move.



Energy affects objects and makes them move and change their places.



3 Energy helps in operating all electric devices.



Energy helps in cooking.



5 Energy helps in lighting houses and streets.



#### **Moving Energy:**

- Energy moves (transfers) from an object to another as in the example below that shows a player kicks a ball as shown in the following steps:
- The kinetic energy transfers from the player's foot to the ball when he kicks it.



Then, the ball moves in the air as a result of the transfer of kinetic energy to it.



Then, the kinetic energy transfers from the ball to the goal net which vibrates as a result of the transfer of kinetic energy to it.



#### Note

Any stopped object on the Earth's surface as in figure (1) has no energy. Any object at a height from the Earth's surface as in figure (2) has a special type of energy known as potential energy.





Figure (1)

Figure (2)

## Check your understanding

- ▶ Put (√) or (x):
  - 1. Energy affects objects and makes them move and change their places.

2. Energy doesn't transfer from an object to another.

In the Assessment Book: Try to answer:

Self-Assessment (18)

# **Exercises on Lesson 1**

Understand

O Apply

Higher Thinking Skills

1 Choose the correct answer:		
1. When a sand surfer moves do	own the hill, this means that he has	, due to
his movement.		
a. kinetic energy	b. stored light energy	
c. potential energy	d. stored electrical energy	
2. Human needs to walk fr	om one place to another.	
a. light energy	b. energy obtained from food	<b>.</b>
c. sound energy	d. energy obtained from batt	ieries
3. Electric motor in the roller coa	aster helps it to	
a. move up to the top of the h		
b. move down to the bottom	of the hill.	
c. stop at the top of the hill.		
d. stop at the bottom of the h	ill.	
4. When an object moves dowr	n a ramp, its stored potential energ	y
a. increases.	<ul><li>b. doesn't change.</li></ul>	
c. changes to a less active for	orm of energy.	0000 (4 2 0000)
d. changes to a more active	form of energy. (Alex	:. 2023/Assuit 2022)
5. When the roller coaster goes	s up, its speed	
a. decreases as it goes dow	n.	
b. decreases as it reaches to	he top of the hill.	
c. is more than its speed wh	en it goes down.	
d. increases as it reaches th	ne top of the hill.	
6. When a wheelchair and a ca	ar go up a ramp, which of them ca	n store some
energy?		
a. The wheelchair only.	b. The car only.	
c. Both of them.	d. None of them.	
7. The roller coaster has the n	nost energy of motion,	
a. as it goes up to the top o		
b. as it goes down the hill.		
c. when it stops at the top of	of the hill.	
d. when it stops at the botto		
8. When the roller coaster sto	ps, its energy of motion	(Sharkia 2024)
a. doesn't change.	b. increases.	
c. decreases.	d. becomes zero.	

<ul><li>9. When a car moves up a ra</li><li>a. gravity force.</li><li>c. kinetic energy.</li></ul>	amp, this happens due to the effect ofb. balanced force. d. sound energy. (Beni-Suef 2024	4
a. light energy. c. solar energy.	ows objects to move is known as b. potential energy. d. kinetic energy.	
Choose from column (B) who	at suits it in column (A) :	
(A)	(B)	
1. When a wheelchair goes down a ramp,	a. it is under the effect of balanced force, and it doesn't store energy.	
2. When a wheelchair stops		
at the top of a ramp,  3. When a wheelchair stops	c. it is under the effect of unbalanced force, where it loses its stored energy.	
at the bottom of a ramp,	d. it is under the effect of balanced force, and it stores energy.	
12	3	Ţ
<b>3</b> Put (✓) or (x):		-
1. We eat food to obtain energ	Jy.	١
2. Energy doesn't transfer from	n an object to another.	, }
	ffected by two opposite equal forces, it will not move.	
	( )	)
4. If a wheelchair moves horiz	contally on the ground, its energy of motion	
equals zero.	( )	)
	ive energy, while the objects that don't move	
have no energy.	(Giza 2022) ( )	
Write the scientific term of e	ach of the following :	à
1	object has due to its movement. ()	
	reases when the speed of an object	
increases.	(Sohag 2022) ()	
Correct the underlined words		
	s down a ramp, its kinetic energy	
doesn't change.	(	

ı	2. If you push a pencil upward, it stops at a certain height then falls	down
	due to the effect of pushing force of gravity.	()
١	3. When an object moves down, it has an active form of energy	
١	known as potential energy.	()
١	4. Under the effect of pushing force of gravity, anything falls down	
	to the ground.	()
	5. Balanced forces cause stopped objects to move.	()
	6. Your potential energy is transferred from your foot to a ball when	you kick it.
		()
	C	-
L	Complete the following sentences:  1. When the roller coaster starts to move, it gets energy from	found in its
	first car which is operated by	
	2. The speed of a roller coaster when it moves toward the top of the	ne hill is
	than that when it moves down the hill.	
	3. If the speed of an object decreases, this means that its kinetic e	energy
	4. When the roller coaster moves up to the top of the hill,energies cause its motion.	and
	5. When you kick a ball, the energy of your foot transfers moves through the air.	to it. So, it
	7 Give reasons for :	
•	The roller coaster doesn't need electricity during its movement of the coaster doesn't need electricity during its moveme	down the hill.
	2. The speed of the roller coaster increases as it moves down the	hill.
	2 opost v. a.e	
	3. The goal net vibrates when a ball hits it.	
	8 What happens to?	
	1. The energy of the roller coaster when it moves down the hill.	
	1. The chergy of the folior deduction means and	
	***************************************	

2. The roller coaster when it lo	oses its kinetic ene	rgy.	
3. The energy of a stopped bal	l at the top of a ram	p starts to move dow	n.
The potential energy of an old surface.	bject when it is plac	ed at a height from th	e Earth's (Cairo 2024)
1. The speed of the car increas a. stops at point (A). b. moves from (A) to (B). c. stops at point (C). d. moves from (B) to (C).	then choose the coses when it	orrect answer :	C.
3. The kinetic energy of the car the car	b. its kinetions. d. it moves increases in all the b. moves from d. speed inc	e following cases, <u>ex</u> om (C) to (D). creases.	cept when
Look at the following figures, to words between brackets: (no -	then complete the - potential - kinetic	sentences below us	ing the
8)			
Figure (1)  1. The ball in figure (1) has  2. The ball in figure (2) has  3. The ball in figure (3) has	energy.	Figure (3)	

# **LESSON TWO**

# Activity 4 Energy Basics

lacktriangle Observe these pictures, then put ( $\checkmark$ ) in front of the bodies that have energy.





- ▶ From the previous concept, you have learned that there is a relation between energy, force and work, where :
  - Force is the effect that changes energy to make it able to do work.
  - So, we can define energy and work as follows:

#### **Energy:**

It is the ability to do work or cause change.

#### Work:

It is a force that causes an object to move a distance.

- Example to show the relation between energy and work:
  - When a football player kicks a ball, the force of his kick causes the ball move in a different direction.
  - Thus the player does work and he consumes energy (that he had obtained from food) to move his leg.
  - So, the work done by this player causes the ball to move.



## Facts about energy:

Energy can be stored and changed from one form into another.

#### Example:

- When you hold a ball, it stores potential energy.
- When you let it fall down to the ground, the ball is moving where the potential energy stored in it is changed into kinetic energy.



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- We cannot see most forms of energy but, we can see and measure what energy can do.
  - We can't see most forms of energy such as: sound energy, thermal energy, electrical energy and chemical energy.
  - We can see and measure what energy can do.



#### Example:

When you push a wooden box and this box moves, this means that the energy transfers from you to the box and also can be measured through the distance that the box moves.

7	TINECK your understanding		
•	Complete the following sentences:  1. The ability to do work is known as  2. The force that causes an object to move a distance is known as		
Þ	Put (√) or (x):		
	<ol> <li>Energy doesn't change from one form into another form.</li> <li>When you push a wall and this wall doesn't move, this means that you do work.</li> </ol>	(	)
	3. The person who pushes a car forward and this car moves, this means that the person consumes energy.	(	)

## **Activity** 5 Kinetic and Potential Energy

▶ Scientists classify energy into two types which are:

## 1 Potential energy

It is the amount of energy that is stored in an object due to its position.



#### Example:

The ball has potential energy stored in it when you lift it up away from the Earth's surface.



It is the energy of an object due to its motion.



#### Example:

The ball has a kinetic energy when you let it fall down to the ground.

 Now, let's see an example to find out how the potential energy can be changed into kinetic energy.

The boy on the tower has potential energy.



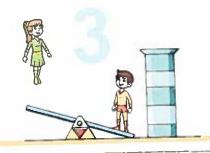
When he jumps down, his potential energy is converted into kinetic energy.



During the movement of the girl up in the air, her kinetic energy is converted gradually into potential energy.



The kinetic energy of the boy transfers to the girl who is standing on the seesaw and causes her to be pushed up into the air.



	80.	-4-
$\mathbf{Y}$		ute

When an object has potential energy, so this object is ready to do work or to be active.

Check your understanding		
<ul> <li>Complete the following sentences:</li> <li>1. Scientists classify energy into two types which are energy energy.</li> <li>2. The object has energy stored in it when you lift it up away to Earth's surface.</li> </ul>		
▶ Put (√) or (x):		
<ol> <li>When an object is placed at a high place, it stores kinetic energy.</li> <li>Any object that moves has kinetic energy.</li> </ol>	(	)

In the Assessment Book: Try to answer: Self-Assessment 19

(

# **Exercises on Lesson 2**

Understand

O Apply

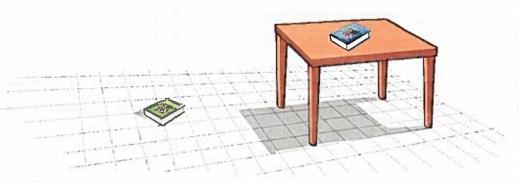
Higher Thinking Skills

	Utilderstand				
1 Cho	ose the correct	answer:	Lin a book placed C	on a table is knov	vn as
		gy that is stored	l in a book placed o	,,,,	(Suez 2024)
	energy.	b. thermal	c. light	d. sound	
a	. potential	D. Mermai	s motion is known as	s energy	. (Cairo 2024)
		object due to its	c. potential	d. kinetic	
a	. sound	b. thermal	The state of the s		·s
∲ 3. T	he energy that	is stored in an o	object due to its pos	(Giza 20)	23/Alex. 2022)
	nergy.	h motontial	c. electrical	d. chemical	
	. kinetic	b. potential			
		rgy that can be	seen is ene	d. sound	
a	a. thermal	b. electrical	c. light		o stono to
5. V	When you throw	a stone in a la	ke, theis tra	insterred trotti ui	e storie to
t	he water surfac	e.			
	a. potential ene	rgy	<ul><li>b. pulling force</li><li>d. kinetic energy</li></ul>		
	c. gravity force				
6.	When a ball on	a certain height	t is left to fall down,	••••	
	a its kinetic end	eray changes in	to potential energy.	•	
	b. its potential e	energy changes	into kinetic energy	•	
	c. its potential energy remains as it is.				
	d. its kinetic energy remains as it is.  7. A stopped object placed at 10 meters high from the Earth's surface has				
7.	A stopped obje	ct placed at 10	meters high from th	ie Faltus sunac	3 11a5
	than the same	object when it is	s placed at the grou	iliu.	
	a. smaller pote		b. larger poter		
	c. smaller kine		d. larger kinet		
53 TI	ho following ta	hle shows Sam	y in different situat	tions. Choose fro	om column (B)
ار کے ال	ie type and the	amount of ene	rgy that suits each	situation in colu	ımn (A) :
				(B)	Time and the
	(A	)	(F-8-3)	AND THE PERSON OF THE PERSON O	
1	. Samy stops a	t 5 meter high	a. he has a stored	electrical energy	/· - atio energies
2	2. Samy stops of	n the ground	b. he does not hav	e potential or Kir	Jelic el lei Ales.
3	3. Samy walks	slowly on the	c. he has a large a	amount of kinetic	energy.
	Earth's surface		d. he has an amou	unt of potential e	nergy.
	4. Samy runs fa Earth's surfa	sion me ce	e. he has a small	amount of kinetic	energy.
	Earling Surface				4
	1	2	3	•••••	4

3 Put (✓) or (x):	
1. We can see all the forms of energy.	(
2. Energy can be stored in the form of potential energy.	
3. Any moving object has a form of energy known as kinetic ener	av.
	(Alex. 2023)
4. When an object is left to fall down to the Earth's surface, its po	otential energy
is changed into kinetic energy.	(
5. We can measure the distance that an object moved as a result force.	of pushing
6. To do work, you must push or pull an object for a certain distan	( )
7. If an object has energy so, it has the ability to do work.	ice. ( )
	( )
Write the scientific term of each of the following:	
1. The energy that is stored in an object due to its position at a cer	rtain
height from the Earth's surface. (Luxor 2023 / Cairo 2	022) ()
2. The energy that the object gains due to its motion.	
(Luxor 2023/Minia 2	022) ()
3. The ability to do work or cause change. (Alex. 2023/Ismailia 2	?022) ()
4. The force that makes an object move over a distance.	()
5. The energy that is changed into kinetic energy when an object	
falls down to the Earth's surface.	()
Correct the underlined words :	
1. The ability to do force or cause change is known as energy.	()
2. We cannot see all forms of energy, except thermal energy.	()
3. As the object moves faster, its potential energy increases.	()
4. The energy form stored in a stopped wooden box placed on	()
a table is kinetic energy.	()
	(·····)
Complete the following sentences:	
1. If you have the ability to push a chair, so you have	
2. When a force moves a ball over a distance, we can say that	is done.
3. If you let an object fall down from a high place so, its end into kinetic energy.	ergy changes

3	4. When an apple falls from a tree, its energy will decrease.
•	5. Some types of energy can be seen such as energy, while some other
	types of energy can't be seen such as and energies.
	6. If an object is placed at a height above the Earth's surface, it stores
	energy.
	7. If a bird flies from the ground up to a high tree, its potential energy will
ļ	8. If you move a bag placed on a table to the floor, its potential energy will
7	Give reasons for:
-	1. A bird stops on a tree has energy.
	***************************************
0	2. When a stone is thrown upwards, its potential energy increases.
1	
8	What happens if?
	1. An apple falls from a tree to the ground. (according to the change in its energy).
	2. You transfer a book from the ground to a higher shelf.
	(according to its potential energy)
	2 Look at the opposite figure, then complete the following sentences:
	1. When the boy lets the ball fall down,
	the energy which is stored in the ball
	changes into energy.
	2. When the ball hits the floor and bounces up,
	its energy will increase as it rises up.

## 10 Look at the figures below, then choose the correct answer:



Book (a)

Book (b)

- 1. According to the potential energy, which of the following statements is correct?.....
  - a. The two books have the same potential energy.
  - b. Book (a) has more potential energy.
  - c. Book (b) has more potential energy.
  - d. The two books have no potential energy.
- 2. If you transfer the book (a) onto table, its potential energy will .........
  - a. increase.
- b. decrease.
- c. not change.
- d. be zero.

# 111 Look at the two opposite figures, then choose the correct answer:

- 1. In figure (a), the acrobat (1) has .....
  - a. potential energy more than that of acrobat (2).
  - b. potential energy less than that of acrobat (2).
  - c. potential energy similar to that of acrobat (2).
  - d. no potential energy like acrobat (2).



Figure (a)

- 2. In figure (b), during the rising up of the acrobat (2) into the air, his .....
  - a. potential energy decreases.
  - b. potential energy increases.
  - c. potential and kinetic energies increase.
  - d. potential and kinetic energies decrease.

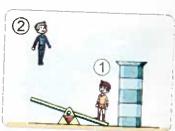


Figure (b)

# **LESSON THREE**

# Activity 6 Forms of Potential and Kinetic Energy

- ▶ Complete the sentences opposite the picture by writing potential or kinetic.
  - 1. The ball has ..... energy.
  - 2. When the boy lets the ball fall down, the ball has .....energy.



- ▶ In the previous activities, you have learned that there are two categories of energy which are kinetic and potential energies.
  - In this lesson, we will study some forms of potential and kinetic energies.

Forms of potential energy

Gravitational potential energy

Chemical potential energy

## Gravitational potential energy

- The Earth attracts objects to its surface by a force called gravitational force (gravity).
- When an object is raised up against the Earth's gravity, this object stores gravitational potential energy.

#### Example:

The roller coaster at the top of a hill stores gravitational potential energy.

## Chemical potential energy

#### Example:

- The batteries store chemical potential energy.
- The chemical potential energy stored in the battery is not used until this battery is connected to a device.





When a spring is compressed, it stores potential energy inside it.



## Factors affecting potential energy of an object:

Mass

By increasing the mass, the potential energy increases.

#### Example:

Ball 1 that has mass of 500 gram has a greater potential energy than ball 2 that has mass of 40 gram.

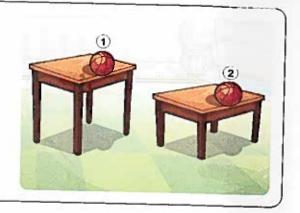


Height

By increasing the height from the Earth's surface, the potential energy increases.

#### Example:

Ball 1 at height 1 meter has a greater potential energy than ball (2) at height  $\frac{1}{2}$  meter.



#### Forms of kinetic energy



as

Movement of sound waves in the air.



#### Light energy



Movement of light waves in the air.



#### Electrical energy



Movement of electricity through wires.



#### Thermal energy



Vibration of particles in a substance during heating.



#### Unit 2 | Concept 2

▶ From the previous lessons, you have known that energy is transformed (changed) easily from one form into another form such as :

Changing of potential energy into kinetic energy:

### Example 11:

- A child at the top of a playground slide has potential energy.
- When the child moves down along the slide, the potential energy changes into kinetic energy.



### Example 2 :

- The egg has potential energy when it is in the boy's hand.
- The egg has kinetic energy as it falls down.



## Check your understanding

► Look at the opposite picture, then complete the sentences using these words:

(kinetic - potential)

- When the roller coaster is at the top of the hill, it stores \_\_\_\_\_ energy.
- When the roller coaster goes down the hill, its potential energy changes into \_\_\_\_\_energy.



## **Activity 7** Types of Energy

Energy is found everywhere around us.

Energy can be

#### **Transferred**

 Energy is transferred from one place to another.

#### Example:

When you kick a ball, kinetic energy of your leg is transferred to the ball.

#### Transformed (changed)

 Energy is continuously changing and transforming from one form into another form.

#### Example:

When the roller coaster goes down the hill, its potential energy is transformed into kinetic energy.

## Some changes of potential energy into kinetic energy

Example		Energy changes		
	- Admple	From	Into	
Flashlight		Chemical energy stored in batteries.	Light energy and thermal energy (heat).	
Gas oven		Chemical energy stored in natural gas.	Thermal energy.	
Spring-powered car toy		Potential energy stored in the spring wire.	Kinetic energy and sound energy.	
Real car		Chemical energy stored in gasoline.	Kinetic energy, sound energy and thermal energy	

## ▶ From the previous explanation, we can conclude that :

- Energy can be stored in many different forms.
- New energy cannot be created and also existing energy cannot be destroyed.

#### Note

- The food you eat also stores chemical energy.
- When you eat food, your digestive system breaks down the food and changes it into energy stored in your body.



## B

## Check your understanding

## ▶ Complete the following table :

	Energy changes		
Example	From	into	
1. Electric fan :	Electrical energy	Kinetic energy	
2. Door bell :	Electrical energy		
3. Radio :		Sound energy	
4. Electric lamp :			

In the Assessment Book:
Try to answer:
Self-Assessment 20

# **Exercises on Lesson 3**

Understand O Apply Higher Thinking Skills 1 Choose the correct answer: 1. A ball at the top of a hill stores ...... energy. a. sound b. light c. chemical d. potential 2. The stored energy in a battery of a flashlight changes into ........ , when it is turned on. a. chemical energy b. sound energy c. light energy d. potential energy 3. All the following examples store chemical energy, except ......... (Cairo 2024) b. natural gas. d. a compressed spring. c. a battery. 4. Energy can do all the following, except ......... a. It can be stored in an object. b. It can be transferred from an object to another one. c. It can be transformed from one form into another one. d. It can be destroyed and cannot be created. 5. If an object stops at a certain height from the Earth's surface for two hours then falls down, this means that ...... a. its potential energy will be destroyed before two hours. b. its kinetic energy will be destroyed after two hours. c. its stored potential energy will change into kinetic energy. d. its stored kinetic energy will change into potential energy. 6. All the following examples have stored potential energy, except ...... a. a stopped roller coaster at the top of a hill. b. a moving car on a flat road. c. a battery of a car. d. a compressed spring of a toy. 7. All the following examples represent kinetic energy, except .......... a. light waves moving through the air. b. sound waves moving through the air.

d. water particles movement during heating.

8. The potential energy of an object depends on ................................ (Cairo 2022)

- a. its mass only.
- b. its height from the Earth's surface only.

c. stored chemical energy in a car battery.

- c. its mass and its height from the Earth's surface.
- d. its temperature.

•	10.00	y that is stored in batteries is called potential	energy.			
	a. chemical b. therm	_				
<u>•</u> 1		s of kinetic energy, except				
	a. light energy.	b. chemical energy.				
	c. sound energy.	d. electrical energy.				
i		e classified into two main groups which are				
	a. light energy and sound					
	b. chemical energy and e					
	c. potential energy and ki		2022)			
	d. magnetic energy and t	nermai energy. (Car	ro 2022) -			
2	Choose from column (B) w	hat suits it in column (A):				
1	(A)	(B)				
	1. Sound energy	a. changes into another form of energy that car	ı be			
	2. Light energy	stored inside the human body.				
	3. Thermal energy	b. when it reaches our ears, it causes hearing.				
	4. Stored chemical c. changes into electrical energy in a flashlight.					
	energy in food d. is produced from electric heater.					
	5. Stored chemical	e. when it reaches the nose, it causes smelling				
	energy in a battery	f. when it reaches our eyes, it causes vision.				
	1 2	3 4 5				
3	Put (✓) or (X) :					
	1. New energy cannot be o	created, but existing energy can be destroyed.	( )			
0	2. A compressed spring sto	ores potential energy. (Alex. 202	24) ( )			
	·	ct from the Earth's surface increases, its potentia	al			
	energy increases.	(Suez 202				
0	4. Kinetic energy cannot b	e transformed into potential energy.	( )			
	5. Light waves are form of		( )			
	6. We can see the movem	ent of electricity through a wire. (Suez 202	23) (			
		energy into stored potential energy when you				
	compress a toy spring.		(			
0	•	cal energy is changed into thermal energy.	(			
		ame masses and placed at the same height,				
	have the same potentia		(			

	4	Write the scientific term of each of the following :	
		1. It is the stored potential energy in a car battery.	(
		2. It is a form of kinetic energy that can move through the air and we can see it.	(
9	3	3. It is a form of kinetic energy due to vibrations of particles in a substance as it heats up.	(
1	4	1. It is a form of potential energy that pulls objects towards the Earth's	surface.
	_		()
I		Correct the underlined words:	
	1	. When an object falls from a certain height, its stored potential energy into chemical energy.	y changes ()
	2	2. The energy that is resulted due to the vibration of particles in a subs	tance ()
	3	. As the height of an object from the Earth's surface decreases,	,····· <i>,</i>
		its potential energy increases.	()
	4	. Thermal, chemical, electrical and light energies are forms of kinetic	()
	5	. A car battery stores a form of kinetic energy known as chemical	
ı	6.	. <u>A fan</u> turns the chemical energy stored in natural gas into thermal en	()
			ergy. ()
	_		)
6		complete the following sentences:	
		Among the forms of potential energy and energies, v	
Î	2.	The energy which is stored in a ball at the top of a hill is pote energy.	
0	3.	Thermal energy is considered as one of the forms of energy.	SHEIKH 2022)
0	4.	Some forms of kinetic energy travel in air in the form of waves such and energies.	as
	5.	Electrical energy is changed in loudspeakers into energy, wh	
		It is changed in the electric fan into energy.	ile
	٥. ح	In the electric bell, energy changes into energy.	
	7.	The chemical energy in the battery of a flashlight can be changed into and energies.	o
	8.	In gas oven, energy changes into energy.	(Giza 2022)
	9.	When a ball is on a table, it stores energy, while as it falls do the ground, this energy changes into	wn to

10. When you clap your hands, the kinetic energy changes intoei while when you rub your hands together, the kinetic energy changes is						
	11. Fireworks produce sound and of energy.					
	12. Television needs ener and energies which ar	gy to be operated and chare forms of kinetic energy.	anges it into			
7	Give reasons for :  1. Electric lamp produces different	forms of energy.				
-	2. On winding up the spring of a to	by car, then let it free, the	car moves.			
8	What happens if?	e (according to	the change of energy).			
	1. You operate a washing machin	e. (abbs.ag				
	2. A boy moves down the slide.	(according to	the change of energy)			
0.00	3. You switch on an electric lamp.	. (according t	o the change of energy)			
و	Cross out the odd word :					
-	1. Sound energy – Electrical energ	y – Thermal energy – Chen	nical energy. (			
	2. Sound energy – Light energy -	– Electrical energy – Ther	mal energy. Jenoufia 2024) (			
1	O Look at the opposite figure, the	en choose the correct ans	wer:			
31	1. Mazen has a big amount of					
	a. potential energy.	b. kinetic energy.	Mazen			
	c. both potential and kinetic e					
	d. both potential and light ene					
	2. Which of the following senten	ces is correct?	Amir Amir			
	a. Amir has kinetic energy mob. Amir has potential energy r	more than that of Mazen.				
	c. Amir has kinetic energy eq	ual to that of Mazen.	The state of the s			
	d. Amir has potential energy	equal to that of Mazen.				
	3. The potential energy of the b					
	a. more than that of	b. equal to the kine				
	c. equal to that of	d. less than that of				

## **LESSON FOUR**

## Activity 8 Easy Life Tool

- You have learned a lot about different forms of energy and how they can transform from one form into another.
- Now, you can use this knowledge to design a tool that helps us to do work.

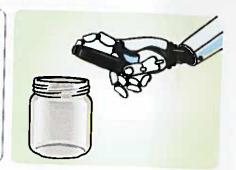
#### Example: -

- · The tool: A robot hand
- · Its function:

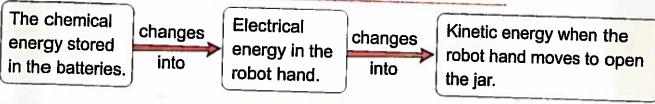
Opening the jar cap that it is hard to be opened.

The source of energy :

The robot gets power from batteries when it is turned on.



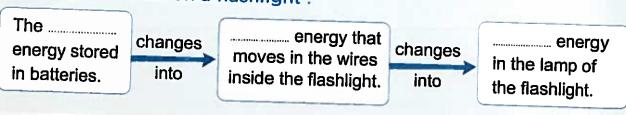
## The changes of forms of energy inside the robot :



- From the previous explanation, we can conclude that:
  - · Energy is not created or destroyed when transferred from the battery to the robot hand.
  - Energy is converted from one form (chemical energy) to another form of energy (mechanical energy) when the robot hand opens the jar.

## Check your understanding

▶ Complete the following diagram that shows the changes of energy when you switch on a flashlight:



## Activity 9 Record Evidence like A Scientist

- ▶ In this concept, you have learned about energy, motion, forms of potential energy and kinetic energy, and energy transformation in engines.
- Now, try to think like a scientist by writing your claim, your evidence and your scientific explanation about one of the main points of this concept through the four steps you have learn in the previous concepts.

	t what are the changes of energy that
ow do moving objects get energy and	what are the changes of energy that
ke place inside them?	
L company of the second second	
Step 2 My Claim	
Step 3 My Evidence	
Step 4 My Scientific Explanation	on

**Review on Concept (2.2)** 

To review this concept look at the Assessment Book "Part 2: Final Revision".

In the Assessment Book:

Try to answer:

- Self-Assessment (21)
- Model Exam on Concepts (2.1) & (2.2)

# **Exercises on Lesson 4**

	<ul><li>Understand</li></ul>	O Apply	Higher Thinki	ng Skills
1	Choose the correct answer	:		
	1. Chemical energy can be s	stored in		(Giza 2022)
l	a. food only.		b. battery only.	
	c. television and food.		d. food and battery	
0	2. Humans cannot live without activities.	out to ob	tain the needed ener	gy for doing théir
	a. reading books		b. driving cars	
	c. watching television		d. eating food	
0	3. When you jump high, the	force affectin	g you must be	
	· ·	balanced.	c. created.	d. destroyed.
	4. The force that is found be its movement is known as		ing car and the groun	d, which opposes
	a. pushing force.		b. electrical energy	
l	c. magnetic energy.		d. friction force.	
	5. When an object begins to changes into	move down	a hill, the potential en	ergy stored in it
	<ol> <li>less active energy.</li> </ol>		b. more active ene	rgy.
	c. light energy.		d. electrical energy	
2	Choose from column (B) wh	nat suits it in	column (A) :	(Cairo 2022)
	(A)		(B)	
	1. Food	a. It can be tr	ansformed into poten	tial energy.
	2. Kinetic energy	b. He has onl	y kinetic energy.	
	3. Potential energy	c. It is the so	urce of energy for hur	mans.
	4. When a child is	d. It is the sto	red energy in an obje	ect.
	running on the ground.	e. He has no	kinetic energy.	

1	2	<b>3.</b>	4	5

f. It cannot be transferred into another form of energy.

5. When a child is

without moving.

standing on the ground

ک	Put (V) or (X):		
	1. Orange, potato and battery contain stored chemical energy.	(	)
	2. A car does work when it moves from one place to another.	(	)
	3. Burning of food inside our bodies produces energy that allow us to do our activities.	(	)
	4. Transformation of potential energy into kinetic energy during your sliding	down	on
	a slide, proves that the energy can be created but cannot be destroyed.	(	)
	5. The stored kinetic energy changes into potential energy, when the gravi	ty pul	ls
	a ball in the air back down to the ground.	(	)
	6. Energy obtained from food is important for your body to move and do di	fferer	ıt
	activities.	(	)
i	7. When you are jumping to a certain height, the mass of your body doesn	't affe	ct
	your potential energy.	(	)
4	Complete the following sentences using the words below:		
	(kinetic — energy — chemical — potential)		
9	1. Any type ofcannot be created or destroyed.		
	2. There are two types of energy which are kinetic and energies.		
	3. When you kick a ball, yourenergy is transferred to the ball.		
	4. The type of potential energy that is stored in batteries is called	energ	y.
E	Write the scientific term of each of the following :		
	1. The type of fuel that is used inside the car to obtain kinetic energy. (		)
	2. The energy that is stored in both food and batteries. (Alex. 2024) (		)
	3. The energy that is stored in your body during your jumping into the air.		
	(,))5.		)
	4. The energy that is produced when an object begins to move. (		)
	What happens if?		
	1. Food burns inside the human body.		
	· · · · · · · · · · · · · · · · · · ·		

	2. You put a battery inside a flashlig	ht, then you sv	vitch it on.	
		(ac	cording to the o	change of energy)
	Write each of the following words	in front of the	suitable sente	ence below :
	(Flashlight – Electr			
	1. Its burning changes the chemical			side
	our bodies.			()
	2. It changes chemical energy into the	hermal energy	to be used in o	cooking.
				()
	3. It changes chemical energy into li		al energies.	()
	4. It changes electrical energy into k	inetic energy.		()
8	Complete the following sentences	below picture:	s :	
	changes	The same of the sa	changes into	100 10
	the radio store ir	energy  the wires  side the radio		Benergy produced from the radio speaker.
1				

## Model 1 Exam

## On Concept [2.2]



1	(A) Choose the correct answer:	5 marks	5)			
	1. When an object moves down a ramp, its stored potential energy					
	a. increases.					
	b. doesn't change.					
	c. changes to a less active form of energy.					
	d. changes to a more active form of energy.					
	2. The form of energy that can be seen is					
	a. thermal energy.  b. electrical energy.					
	c. light energy. d. sound energy.					
	3. All the following examples store chemical energy, except					
	a. food. b. gasoline.					
	c. a battery.  d. a compressed spring.					
	4. When you jump high in the air, the forces affecting you must be					
	a. balanced. b. unbalanced.					
	c. created. d. destroyed.					
	Both the Sun and electric lamp produce two forms of energy.					
5	(A) Put (✓) or (X):	(5 mar	rks)			
	1. The objects that don't move have no energy.	(	)			
	2. To do work, you must push or pull an object through a certain distance.	(	)			
	3. Light waves is a form of potential energy.	(	)			
	4. Orange, potato and car battery contain stored chemical energy.					
	(B) What happens if?					
	A stopped ball at the top of a slope starts to move down.	onor	ص۱ <sub>/</sub>			
	(according to the change of its	s energ	99,			
			•••••			

boy is ..... the ball.

<b>3</b> (A) Correct the underlined words:	(5
1. When an object falls down, it has more active form	(5 marks) Of energy
known as potential energy.	()
2. Sound energy produced from the gas oven is used i	in cooking food.
	()
3. A battery stores a form of kinetic energy known as c energy.	hemical
4. Gasoline contains electrical potential energy.	()
potential energy.	()
(B) Complete the sentences using the words below:	
(changes into – transferred to – chemic	al – kinetic)
2	
1. Food store 3 energy that the	4. The kinetic energy of the
energy have a recommendation of the second o	— <del>-</del>

boy uses to kick a ball.

energy.

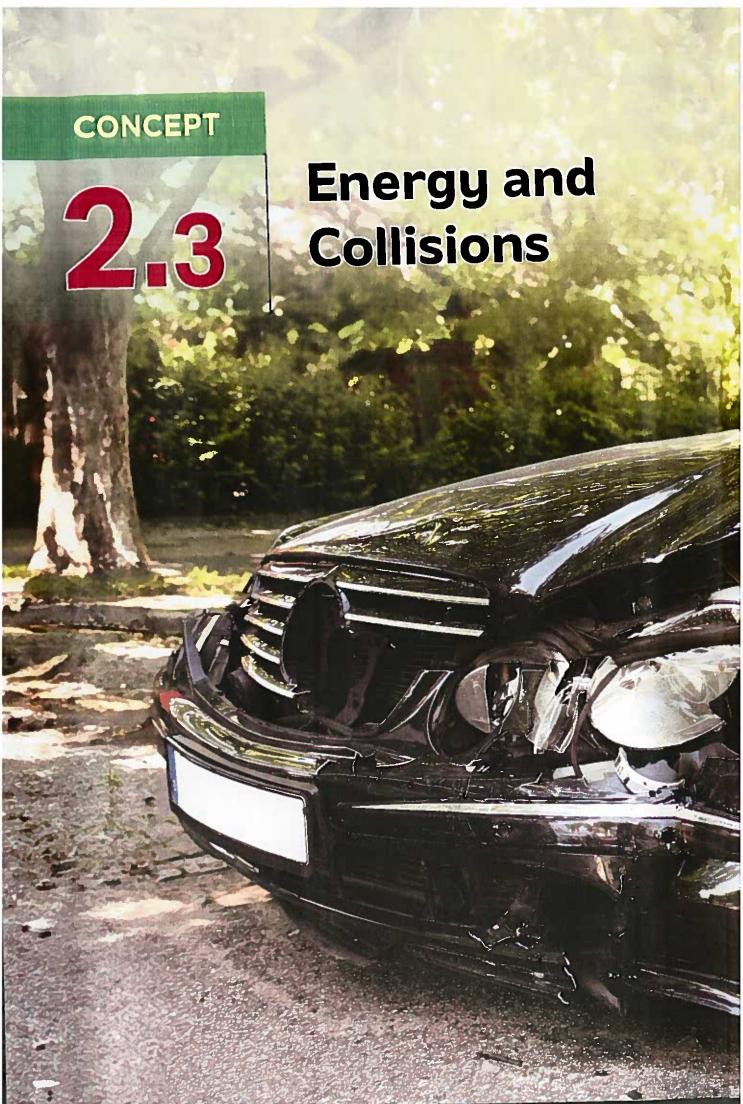
## Model 2 Exam

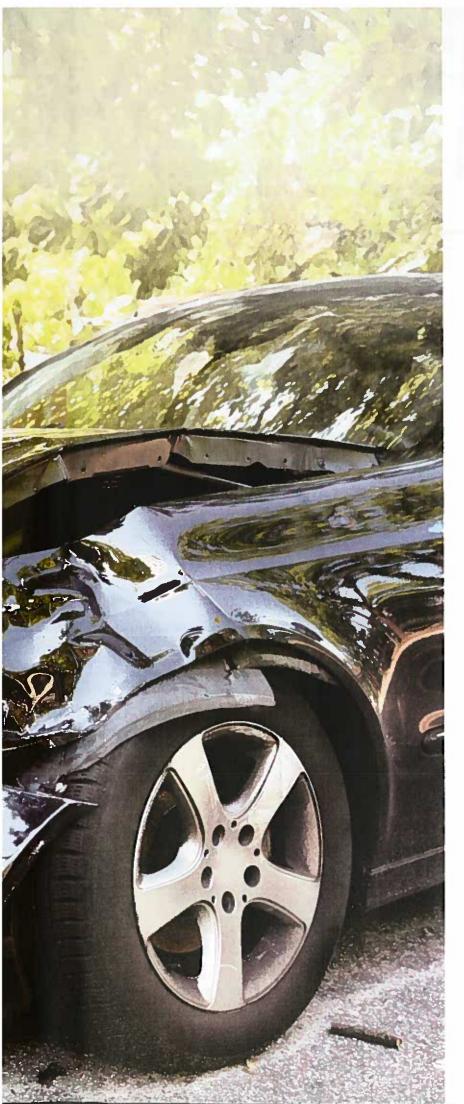
## On Concept [2.2]



1	(A) Write the scientific term of each of	of the following:	(5 marks)				
Ì	1. The form of energy that the object h	nas due to its movement.	()				
	2. The energy that is used to operate	all electric devices.	()				
	3. The form of energy that is stored in	side an object placed at					
	a high place from the ground.		()				
	4. The energy that is stored in both foo	od and batteries.	()				
	(B) Cross out the odd word:						
	Sound energy – Electrical energy	<ul> <li>Thermal energy – Chemic</li> </ul>	cal energy.				
			()				
2	(A) Choose the correct answer :		(5 marks)				
	1. When you stop on the ground with	out moving, so you have					
	a. the most kinetic energy.	b. no kinetic energy.					
	c. the most potential energy.	d. the least light energy.					
	2. All the following forms of energy do not affect the movement of a moving object,						
	except						
	a. sound energy.	b. light energy.					
	c. electric energy.	d. kinetic energy.					
	3. The most potential energy stored	in an object, is that when it	is				
	a. moving on the ground.						
	b. at the top of a hill.						
	c. standing without movement on	the ground.					
	d. at the bottom of a hill.						
	4. The stored energy in a battery of	a flashlight changes into	, when it is				
	turned on.						
	a. chemical energy	b. sound energy					
	c. light energy	d. potential energy					
	(B) What happens if?	2					
	You switch on an electric lamp.	(according to the char	nge of energy).				
	***************************************						

3 (A) Put (✓) or (x):		
1. As the height of an object from the Earth's surface increases, its pote energy decreases.	ential ,	arks,
2. Energy doesn't transfer from an object to another.	(	)
<ol> <li>New energy cannot be created, but existing energy can be destroyed</li> <li>Burning of food inside our bodies produces energy that allow us to do</li> </ol>	1. (	)
activities.	our (	)
(B) Give a reason for the following:		
A bird stops on a tree has energy.		
	***********	•••••
***************************************		





### Learning outcomes

## By the end of this concept, your child will be able to:

- Analyze and interpret clata
  to describe how the speed
  and mass of objects relate to
  changes observed in a collision.
- Construct an explanation based on evidence and logical reasoning to describe energy transfer in a collision.
- Apply mathematical thinking to organize data to represent patterns related to mass, speed and the energy of objects.

### Key vocabulary

- Collision
- Mass

## Notes For Parents

## On Concept [2.3]

Lessons	Activities	What you should do with your child
	Activity 1	Discuss with your child that faster and heavier objects have more energy than slower and lighter ones.
1	Activity 2	Help your child to know that kinetic energy can transfer from one object to another.
	Activity 3	Help your child to find out some online sources to learn more about the importance of seatbelts and airbags during accidents.
2	Activity 4	Help your child to know the relation between speed, distance and time.
2	Activity 5	Discuss with your child the relation between the speed and kinetic energy of an object that moves on a ramp and the angle of inclination.
2	Activity 6	Discuss with your child the meaning of collision and let him/her mention some examples of collision between objects.
3	Activity 7	Discuss with your child the effect of speed on collision between objects.
	Activity 8	Let your child to do a simple experiment to find out the relation between force, speed and kinetic energy of a moving object.
4	Activity 9	Discuss with your child the effect of mass on collision between objects.
	Activity 10	Discuss with your child how kinetic energy transfers between objects.

## **LESSON ONE**

### Activity 1 Can You Explain?

The truck (heavier object) has :

- More mass.
- More speed.
- More energy.



The small car (lighter object) has:

- Less mass.
- Less speed.
- Less energy.
- What happens to objects when they collide with each other?
  - In the example above, if the truck is the faster object, it has more energy than the car which is the slower object.

Therefore, during collision, the object that has more energy (the truck) causes more damage than that has less energy (the car).

#### **Example of collision:**

#### A wrecking ball:

- It is a very heavy steel ball that swings on a cable.
- It is used to collide with walls of a building to help construction workers knock down walls or parts of buildings.



Wrecking ball

#### In this concept, we will study:

- Collision of objects.
- · Basics of speed.
- Energy and collision.
- The effect of speed and mass on collision.
- · Energy conversions during a collision.

heavier	انعل	mass	الكيلة	steel	فولاذ	knock down	بهدم
lighter	أخف	truck	شاحبة	damage	دمار	basics	مبادئ
collision	مصادم	wrecking ball	كره الهيم	construction	اليداء	swing	نتأرجح

## Activity 2 Collision

Look at this	picture, then	put (√	) or (*) :
--------------	---------------	--------	------------

- 1. The ball transfers its kinetic energy to the bat. ( )
- 2. The ball will move in different direction, when the bat hits it.



#### **Collision in cricket:**

- · A cricket is a popular game all over the world.
- In cricket, a player uses a wooden bat to hit a ball.
- The cricket player holds a bat and moves it as the ball comes towards him at high speed to collide with the bat.



#### ▶ What happens to the energy of the moving bat when it hits the moving ball?

- The bat transfers its kinetic energy to the ball.
- Then, the speed of the ball increases and the ball returns back in a different direction.
- This collision produces a popping sound and the player would feel the bat hitting the ball.

#### **Check** your understanding

#### ▶ Put (√) or (x):

- After collision between a ball and a bat, the direction of the ball will not change.
- During collision between a ball and a bat, the kinetic energy transfers from the bat to the ball.

bat hits transfer مضرب

popular

popping sound بنقل

صوت فرقعة

## **Activity 3 Watching Objects Collide**

#### What happens to the driver's body when the car stops suddenly?

- The driver's body continues to move forward where the objects that are in motion stay in motion until something stops them.
- But, What are the safety equipment that keep the driver and passengers in their places?

#### Safety equipment used during collision of cars:



They are used in cars to keep the driver and also the passengers from moving forward when the car stops suddenly, so seatbelts have saved thousands of lives.



### 2) Airbags :

#### Their structure:

Airbags are made up of thin nylon material folded into the steering wheel, seats, dashboard or doors.

#### Idea of operation:

#### **During collision**

- Airbags inflate automatically when sensors in the car detect a crash.
- A sensor tells the airbags to inflate and fill with a gas to provide a soft cushion.



#### After collision

 Airbags deflate almost as fast as they inflate, because they have holes (vents) to allow them to deflate, so the driver can get out of the car.



#### Their importance:

- Airbags slow the speed of the driver's motion forward.
- Airbags absorb the energy of the passengers on collision.

suddenly وسائل الأمان suddenly seatbelt

inflate حزام الأمان

steering wheel

cushion عجلة القيادة

passengers

وسادة راكبين

239 تتكمش

## Give a reason for :

#### Airbags deflat quickly after few seconds of collision.

- Because they contain small holes (vents), through which the gas comes out, so the driver can get out of the car.

#### Collisions between trains and cars:

- There are many accidents in which a train hits a car that may be stuck on the train tracks.
- Trains are much larger than cars. Also, trains can travel at a high speed.
- It is more dangerous, as the force of the collision between the car and train increases.





#### Check your understanding

- ▶ Complete the following sentences :
  - 1. Safety equipment of cars during collision include and
  - material. 2. Airbags are made up of thin
  - protect passengers during collision where they inflate 3. In cars, ... automatically when sensors in the car detect a crash.

In the Assessment Book: Try to answer: Self-Assessment (22)

# **Exercises on Lesson 1**

				THE RESERVE
	<ul><li>Understand</li></ul>	<ul><li>Apply</li></ul>	Higher Thinking Skil	ls
1	Choose the correct answer	:		
	1. When objects collide wit a. time b. distar			en them.
	<ol> <li>The object that has the rand lightes</li> <li>the fastest and heavier</li> </ol>	st b. the slo	/, is object. owest and lightest owest and heaviest	
•	3. A wrecking ball is made a. plastic. b. nylon.		d. wood.	(Damietta 2024
	4. In cricket game, the bat a. kinetic b. poten		energy to the ball. al d. chemical	
	<ul><li>5. Collisions usually product</li><li>a. solar energy.</li><li>c. gravitational potential</li></ul>	b. sound		(Sohag 2023
	6. When the cricket bat hits speed	sn't change. nges.	lirection and the	ball
	7. Seatbelts work when the a. decreases its speed g c. suddenly stops.	radually. b. increa	ses its speed gradual gradually.	ly.
4	<ul><li>8. If there is nothing to stop</li><li>a. stay in motion.</li><li>c. stop after few minutes</li></ul>	b. stop a	this object will fter few hours. fter few seconds.	
	<ol> <li>When a car that moves f</li> <li>a. backward.</li> <li>b. forward</li> </ol>	orward stops sudd		i.
	40 41			(Cairo 2023)
	10. Airbags in the car are fol	ded into all the foll	owing places, except	•••••

b. dashboard.

d. tires.

a. steering wheel.

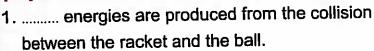
c. doors.

### 2 Choose from column (B) what suits it in column (A):

(A)		(B)	
1. Wrecking ball	a. it is one of the safety e		
2. Cricket bat	inflated with a gas duri		
2. Official but	b. it changes its sound en	nergy into light energy.	
3. Seatbelt	c. it is used to hit a ball d	uring playing.	
4. Airbag	d. it is one of the safety of passengers in their pla	equipment in cars that keeps aces during crashes.	
	e. it is used to hit a wall d	uring destruction of a building	-
1 2.	<b>3.</b>	4	
Put (🗸) or (X) :		to a few to the ball (	,
	nits the ball, its potential energ	-	,
	e safety equipment in cars.	(Cairo 2023) (	•
	een two cars, the potential en	ergy transfers from	
the faster car to the	siower one. ne airbags deflate as fast as th	nev inflate.	
4. Aller car comsion, u	ie alibago deliate de laet de l	(Cairo, Alex. 2024) (	
5. When a fast car hits	a very big tree, the kinetic en	nergy of the car transfers	
into the tree.		(	tarre d
Write the scientific te	rm of each of the following :		
1. A heavy steel ball th	nat swings on a cable and is u	sed in destruction	
of parts of buildings		(Luxor 2023) <b>(</b>	
	sed to prevent car passenger	s from moving	
forward when the c		(	
	sed to provide soft cushion w	nen it is iiiliateu (	
	ngas during collision of cars. I car airbags and allow them to		
collision.	cal all bags and allow them to	(	•••
Correct the underline	ed words:		
1. A fast and heavy of	oject has more potential energ	gy than a slow and	

3. When a train at a high speed hits a car, the train gets more damage	. ()
4. As a result of hitting the ball with the wooden bat, the speed of the ball doesn't change.	
	()
5. Seatbelts absorb the energy of the passengers during collision when they inflate.	
(ornag zon	23) ()
6. Airbags are made up of thick wooden material.	()
7. The cricket bat transfers its light energy to the ball.	()
Complete the following sentences :	
1. When a bat hits a ball strongly, the energy of the bat is tra	
2. Among safety equipment which are used during collision of cars and	
3. As a result of collision between the ball and the bat, the direction of will	of the ball
4. During a car crash, the is inflated with a gas to provide a s 5. Airbags absorb the of the passengers during collision.	soft cushion.
o. When objects collide with each other, is transferred between	en them
6. When objects collide with each other, is transferred betwe 7. In cars, the prevents passenger from moving forward whe	en them.
7. In cars, the prevents passenger from moving forward whe suddenly stops.	en them. en the car (Giza 2023)
7. In cars, the prevents passenger from moving forward whe	en the car
7. In cars, the prevents passenger from moving forward whe suddenly stops.	en the car
7. In cars, the prevents passenger from moving forward whe suddenly stops.  7 Give reasons for:	en the car
<ul> <li>7. In cars, the prevents passenger from moving forward whe suddenly stops.</li> <li>7 Give reasons for: <ul> <li>1. Seatbelts in cars are very important.</li> </ul> </li> </ul>	en the car
<ul> <li>7. In cars, the</li></ul>	en the car
7. In cars, the	en the car (Giza 2023)

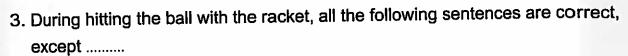
# Look at the opposite photo that shows a tennis player, then choose the correct answer:



- a. Electrical and kinetic
- b. Kinetic and light
- c. Electrical and sound
- d. Kinetic and sound

2.	When	the	racket	hits t	he	ball,	the		of the	ball	is	change	d
----	------	-----	--------	--------	----	-------	-----	--	--------	------	----	--------	---

- a. size
- b. mass
- c. direction
- d. color



- a. the ball changes its direction.
- b. kinetic energy transfers from the racket to the ball.
- c. the speed of the ball changes.
- d. the size of the ball decreases.

1	Look at the opposite photo that shows a crash between a	train and	a car,	then
	answer the questions below :			

In your opinion, which one of them is damaged more than the other? (Give a reason for your answer).	
2. What happens to the car airbags during the crash?	
	***************************************

## **LESSON TWO**

## **Activity 4 Basics of Speed**

- ▶ Look at this picture, then put (✓) or (✗):
  - 1. The speed of the motorcycle affects the amount of damage that will happen to the ice cream cart.
  - 2. The kinetic energy of the motorcycle transfers to the ice cream cart during collision.



• In this activity we will study the meaning of speed and how we calculate it.

#### Basics of speed:

Speed is a measurement of how fast something is moving.

#### Speed:

It is the distance that an object travels in a certain amount of time.

#### Calculating the speed:

 To calculate the speed of any moving object, we can divide the distance that the object moves by the time taken to travel that distance as follows:

So, we can define speed also as, distance per unit time. The measuring unit of speed may be :

Kilometer Per Hour (km/hr)

Meter Per Second (m/sec)



The speed of an object is not affected by the direction of this moving object.

#### Example:

If a car moves forward 5 meters in one second, then it moves backward 5 meters in one second, so its speed is still 5 meters per second.

#### Problems:

1. Amir runs 100 meters in 20 seconds. Calculate the speed of Amir.

$$Speed = \frac{Distance}{Time}$$

Speed = 
$$\frac{100}{20}$$
 = 5 m/sec.

Distance = 100 m. Time = 20 sec.

#### Unit 2 | Concept 3

#### 2. If a bus traveled 600 kilometers in 5 hours. Calculate the speed of the bus.

Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
Speed =  $\frac{600}{5}$  = 120 km/hr.

#### Comparing the speed of two moving objects:

- To compare the speed of two moving objects, we can use one of the following two ways:
  - 1. Measure the distance that both objects travel in the same amount of time.
  - The object that travels a greater distance in the same amount of time is moving at a greater speed.
  - Example :

If two runners run for 1 hour, where:

- The first runner travels 6 kilometers.
- The second runner travels 9 kilometers.

So, the second runner is moving at a greater speed, because he travels a greater distance (9 km) in the same amount of time (1 hour).



- 2. Measure the time that both objects take to travel the same distance.
- The object that travels the same distance in a smaller amount of time is moving at a greater speed.
- Example :

If two cars are racing 120 kilometers, where:

- The first car reach the end line of race in 1 hour.
- The second car reach the end line of race in 2 hours.

So, the first car is moving at a greater speed, because it travels the same distance (120 kilometers) in a shorter time (1 hour).



#### Check your understanding

Complete the following sentences using the words below:

(speed - faster - slower)

- 1. A car that travels 90 kilometers per hour is ...... than a car that travels 60 kilometers per hour.
- 2. Two bicycles are racing for 500 meters, the bicycle that finishes the race in a greater time is ...... than the bicycle that finishes in a shorter time.
- 3. The distance per unit time is known as ......

## **Activity 5 Racing Downhill**

- · You have learned about speed and energy, in this activity you will measure the speed and the kinetic energy of an object moving down a cardboard tube at various incline angles.
- Now, let's study the relation between speed and kinetic energy.





Toy truck



Metric ruler



Cardboard paper towel tube



Paper cup



Stopwatch



Scissors



**Books** 



#### Part (1): The relation between the speed and the angle of inclination.

- 1. Put one end of the tube on the top of two books, and the other end of the tube resting on the ground.
- Record in a table the number of books used to set up the tube in the column "Number of books".
- 3. Roll the truck down the tube. Use the stopwatch to determine the time and record in the table how long the truck takes to travel to the end of the tube in the column "Time to travel".



4. Add one book to change the incline angle and repeat the steps, then add another book and repeat the steps again.



As the "Time of travel" is less, the speed of the toy truck is higher.

#### Part (2): The relation between the kinetic energy and the angle of inclination.

- 5. Now, repeat the activity as in part (1), but place the paper cup at the bottom of the tube as shown in the opposite figure.
- Measure the distance the cup moves each time after the truck rolls into it, and record in a table the distance that the cup travels in the column "Distance the cup traveled".



	Part (1)	Part (2)
Number of books	Time to travel	Distance the cup traveled
2 books	5 seconds	3 cm
3 books	3 seconds	4 cm
4 books	2 seconds	7 cm

#### Note

As the "Distance the cup traveled" is longer, the kinetic energy of the toy truck is greater.

#### **Observations**

- As the angle of inclination increases, the speed of the truck increases as it takes less time to reach the end of the tube.
- As the angle of inclination increases the distance that the paper cup traveled increases.

#### Conclusions

- As the angle of inclination of a moving object increases, its speed increases.
- As the speed of a moving object increases, its kinetic energy increases.
- So, both speed and kinetic energy increase, as the angle of inclination increases.

#### **Check** your understanding

Complete the following sentences using the words below:

#### (increases - faster - kinetic)

- 1. If the incline of a ramp increases, the object rolling down it will be .....
- 2. When the speed of an object increases, its kinetic energy ......
- 3. We can use the speed of an object to know the ..... energy of this object.

In the Assessment Book: Try to answer: Self-Assessment (23)

# **Exercises on Lesson 2**

<ul> <li>Understand</li> </ul>	<ul><li>Apply</li></ul>	• Higher	Thinking Skills
Choose the correct answe	er:		
1. The measuring units of			
<ol> <li>a. second and meter.</li> </ol>	b. h	our and kilome	eter.
c. nour and second.	d. k	ilometer and m	neter.
2 and are the robject. a. Time – kinetic energy b. Distance – kinetic ene c. Distance – time d. Kinetic energy – poter	nain factors that ergy	we need to ca	lculate the speed of an
3. How can we calculate th		niect 2	// uwor 2022 / 4.4 - 200
a. Speed = distance ÷ tir	ne. b. S	קפסני: Deed ≃ distanc	te x time
c. Speed = distance + tir	ne. d. S	peed = distance	ce – time.
4. Which of the following is			
	c/m. c. k		
			(Menofia 2023 / Cairo 2022
5. What is the speed of a c	ar that travels 40	00 meters in 4 s	second ?
a. 100 m/sec. b. 20	m/sec. c. 30	) m/sec.	d. 40 m/sec.
			(Alex., Gharbia 2024
<ol> <li>When the kinetic energy</li> <li>a. increases – doesn't ch</li> <li>c. decreases – doesn't ch</li> </ol>	hange. b. in hange. d. de	creases – incre ecreases – incr	eed (Sharkia 2023 eases. reases.
7. As the angle of a ramp d and its kinetic energy	••••	eed of a toy ca	ar rolling on it
a. increases – decreases		creases – incre	
c. decreases – decrease	3900	ecreases – incr	eases.
8. An object keeps moving		l when	
a. its kinetic energy decre			
b. its potential energy inc			
c. no another force stops			
d. another object collides			
9. If the angle of inclination moving down it will	of a hill increase	s, the kinetic e	nergy of an object
	ease. c re	main as it is	d he destroyed

10	<ol> <li>The following figures show a ramp and a flat surface of 2 me</li> <li>If two toy cars of equal masses are pushed with equal force</li> </ol>	eters lengti es at the s	n for eac áme	ach.	
	moment, so				
	same moment.	1	2		
	b. the yellow car reaches the end of the ramp first.	2 m			
	c. the red car reaches the end of the ramp first.			1	
	d. the yellow car has kinetic energy larger than that			•	
1	of the red car.	2 m		_	
	Put (✓) or (X):				
1	. The speed is a measurement of how fast something is mov	ing.	(	)	
• 2	. The speed is distance per unit time.	(Cairo	2024) (	)	
	. We can measure the covered distance in kilometer unit.	(Minia	2023) (	)	
	. When Rana runs 50 meter in 10 seconds, her speed is 500	m/sec.	(	)	
	. If car (A) covered a distance of 100 kilometers in one hour	and car (E	3)		
	covered a distance of 100 kilometers in two hours so, car (	B) is faste	r than		
	car (A).		(	)	
• 6	5. The angle of inclination of a ramp affects the speed of an o	bject mov	ring		
	on it.		(	)	
• 7	<ol> <li>If two objects cover the same distance in the same time so</li> </ol>	, they hav	e simila		
	speed.		(	)	
. 6	3. When an object moves down on a ramp, its speed increas	es by dec	reasing t	he	
	angle of inclination of the ramp.		(	,	
• 6	9. When two similar objects move with the same speed, they	have diffe	rent kine	tic	
	energies.		(	)	
3	Write the scientific term of each of the following:				
T	1. The distance that an object travels in a certain amount of	ime.	(	)	
	2. The measuring unit of the speed.		(	)	
	2. The modeling dimest and open a				
4	Correct the underlined words:				
•	1. When the speed of an object <u>increases</u> , its kinetic energy d	ecreases.	(	)	
	<ol><li>When the angle of inclination of a ramp increases, the spe</li></ol>	ed and ki	netic ene	rgy	
	of an object moves down on it decreases.		(		
	3. When an object moves at a very high speed, it has a sma	<u>II</u> amount	of kinetic	;	
	energy.		(		

Somplete the following sentences:	
1. When the speed of a car increases, its energ	TV increases (Supple
2. A car with speed = 60 km/hr, its kinetic energy is car with speed = 40 km/hr, if they have the same mas	than that of another
3. A train that travels 150 kilometers per hour istravels 100 kilometers per hour.	. than another train that
4. The speed depends on the distance that is measured and the time that is measured in or	d in kilometers or
5. A car covers 80 meters in 4 seconds, so it moves at a s	speed equalsm/sec
6. If the kinetic energy of a moving body decreases, its	speed will
7. If the angle of inclination decreases, the speed of an will	object moves down on it
6 Give reasons for :	
The speed of a truck is more than that of a small car who on the same ramp.	
What happens if?	
	s kinetic energy) (Giza 2023,
We increase the angle of inclination of a ramp on which (according to the second	
Look at the opposite photos, then answer the question	or halow.
	is nelow:
<ol> <li>Which one of the two animals has greater kinetic energy (rabbit or tortoise) ?</li> </ol>	1
(Give a reason for your answer).	Charles 40 to 18
2. If the speed of the rabbit decreases, so its kinetic	Speed = 40 km/hr.
energy will (Complete).	Speed = 1 km/hr.

Find the speed of a runner, if you know that he covers 40 seconds.	( <b>Gi</b> za 20
A train travels from Cairo to Alexandria in a distance of 20	
Find its speed.	(Cairo 2023 / Minia 20
Look at the opposite figures that show a toy truck moves	
down two different ramps, then answer the questions below:	
Which ramp makes the truck have more speed?  (Give a reason for your answer).	Ramp (A)
2. What happens to the speed of the truck when	Ramp (B)
increasing the angle of inclination of ramp (B)?	
If there is a cheetah covers 240 kilometers in 2 hours an	d there is a deer cov
210 kilometers in 3 hours. Can the cheetah attack the de	

## **LESSON THREE**

## **Activity 6 Energy and Collisions**

### ▶ Look at this picture, then put (√) or (x):

- Before collision the moving car has a potential energy as it is running on the street.
- 2. During collision between two objects, there is no change of energy occur. ( )



- In this activity we will learn the effect of collision on energy transfer.

#### **Energy and collisions:**

- When you and your friend crash with each other, we can say a collision happens between both of you.

#### Collision:

It is the bumping or crashing of two objects into each other.

#### When two objects collide with each other:

- An amount of energy transfers between them.
- Changes of energy occur.

### Example of collision between two objects:

What happens if you are running down the street without looking in front of you and hit a traffic sign post?

#### In this situation:

- You will stop moving forward.
- You may bounce off and get hurt.
- The traffic sign post may vibrate.



- In the previous example, what are the changes and transfer of energy that take place?
  - The kinetic energy transfers from your body to the traffic sign post. This leads to the vibration of the traffic sign post.
  - · A part of your kinetic energy changes into a sound energy (the sound you hear on collision).

### Check your understanding

▶ Look at the following picture, then complete the sentences using these words:

(kinetic - collides - cart)

- 1. The bicycle has \_\_\_\_ energy as it is running on the street.
- 2. When the cyclist ..... with the bread cart, the kinetic energy of the bicycle transfers to the \_\_\_\_ and the bread, that causes the cart tips over and the bread scatters.



## **Activity 7** The Effect of Speed on Collisions

▶ From the previous activities, you have learned that as the incline of the ramp increases, the speed of the object increases.

The amount of kinetic energy of a moving object depends on

The mass of object.

The speed of object.

- Now, we are going to study the effect of speed on collisions.
- ▶ When a fast object crash into another object, the faster object transfers some of its energy to the other object, where :
  - By increasing the speed of the object, the energy that transfers during collision will increase.
  - Some of this transferred energy may be in the form of heat, light or sound.



Comparison between a fast-moving object and a slow-moving object:

Control of the state of the sta		
Fast-moving object	Slow-moving object	
It has more energy.	It has less energy.	
When this object hits another object, it exerts more force.	When this object hits another object, it exerts less force.	
This force causes a big damage to the object that cannot be repaired.	This force causes less damage to this object than the fast-moving object.	



Driving fast is very dangerous, because if a car increases its speed, its kinetic energy increases that results in exerting a large force during an accident.

## What happens if ...?

1. Two cars move at different speeds in opposite directions collide with each other?

The forces exerted in the accident depend on the speed of both cars, so damage would be more stronger because they move in opposite direction.



2. Two cars move at different speeds in the same direction collide with each other?

The forces exerted in the accident depend on the speed of both cars, this leads to damage that would be less stronger because they move in the same directions.



## Check your understanding

- ▶ Complete the following sentences :
  - The amount of kinetic energy of an object depends on both \_\_\_\_\_ and \_\_\_\_ of this object.
  - 2. Fast-moving objects have kinetic energy, while slow-moving objects have kinetic energy.
  - 3. By increasing the speed of an object, its kinetic energy ...

In the Assessment Book:
Try to answer:
Self-Assessment 24

# **Exercises on Lesson 3**

	Understand	O Apply	<ul><li>Higher Thinking Skills</li></ul>	100	
1	Choose the correct answer	:			
			eases, the energy that transfers	during	
	a. increase.		b. decrease.		
	c. not change.		d. equal zero.		
	2. A fast-moving object has	that of a s	slow-moving object.		
	a. the same energy as		b. more energy than		
	c. less energy than		d. no energy as		
ì	3. The two factors affecting t	the kinetic ener	gy of an object are		
	a. its speed and color.		b. its mass and color.		
	c. its speed and mass.		d. its light and sound energies.		
2	4. As the mass of a vehicle in	ncreases, it nee	eds to gain		
	a. less force – less potent	ial energy.			
	b. more force – more pote	ntial energy.			
	c. less force – less kinetic				
	d. more force – more kine				
٠	each other, the resulted da	amage	re with the same speed collide w	vith	
	a. is larger in one of them	and smaller in	the other.		
	b. is equal in both of the tv	vo objects.			
	c. doesn't depend on the r	nass of the two	objects.		
6	d. doesn't depend on the s  On collision, energy is	speed of the two	o objects.		
Ĭ	a. created.	····	h deet		
	c. created and transferred.		b. destroyed.		
7			d. transferred and changed.		
′	. when car and truck collide	with each other	er in opposite directions,		
	a. the car has more energy	y and causes m	ore damage.		
	b. the truck has more ener	gy and causes	more damage.		
	c. the car has less energy	and causes mo	re damage.		
	d. the truck has less energ	y and causes le	ess damage.		
8.	. All the following factors affe	ect the kinetic e	energy of a moving car, except		
a. the mass of the car.					
	b. the pushing force of the				
	c. the airbags inside the ca				
	d. the inclination of the road	d on which the	car moves.		

- 9. The mass of an object ......
  - a. doesn't affect its potential energy or its kinetic energy.
  - b. affects its potential energy and its kinetic energy.
  - c. affects its potential energy only.
  - d. affects its kinetic energy only.

### Choose from column (B) what suits it in column (A):

they produce very small amount of damage.

(A)	(B)
1. A heavy object that doesn't move 2. A light object that doesn't move 3. A fast object with a heavy mass 4. A slow object with a light mass	<ul> <li>a. has much kinetic energy.</li> <li>b. has much light energy.</li> <li>c. if it moves with a fast speed, it has much kinetic energy.</li> <li>d. has low kinetic energy.</li> <li>e. if it moves with a low speed, it has low kinetic energy.</li> </ul>

#### 3 Put (√) or (X):

1 41 (7 ) 51 (1.)		
1. Fast-moving objects can be exposed to less damage than slow ones.	(	)
2. A slow and light object has much kinetic energy.	(	)
3. When you drive on high speed, the kinetic energy decreases.	(	)
4. When two bikes collide with each other, an amount of energy transfers be	twee	n
them.	(	)
5. You have to drive a car as fast as possible, because at high speeds you		
can avoid collisions.	(	)
6. When you collide with an object a part of your kinetic energy may change	into	
sound energy.	(	)
7. A slow-moving object has more energy and force than that of a fast-moving	ng	
object.	(	)
8. To increase the speed of a moving object, you can collide it with another		
object that moves in the opposite direction.	(	)
Q. When two heavy and fast cars move in opposite directions collide together	er,	

-	Write the scientific term of each of the following:	
	1. The process in which two objects bump or crash into each other, and including an energy transfer.	
	2. The energy that can be heard and usually produced when two	(
	objects collide with each other.	(
		<b>\(\)</b>
	5 Correct the underlined words:	
	1. By increasing the speed of the object, the energy that transfers du collision will decrease.	ring its
		()
	2. When two cars collide with each other, the potential energy transfer the faster car to the slower car.	
	3. A fast-moving object has more energy and force that cause less da	() 
	during its collision.	
	4. The effect of collision increases, when the speed of the body decre	()
	- Mich the speed of the body decre	ases. ()
	5. Two objects of the same mass and placed at the same height	()
	have the same kinetic energy.	()
-		()
L	Complete the following sentences :	
	The amount of kinetic energy of a moving object depends on its its	and
•	2. During collision of two moving bikes, transfers between the	<del>i</del> m
•	When two cars collide with each other, some of energy may change heat , and	e into
•	4. The bumping or crashing of two objects into each other is called	
1	5. When a moving car hits a tree, a part of the energy of the	ar changes
	into a energy which you hear it.	ai Gianges
Ż	Give reasons for :	
i	1. When two objects collide with each other, you can hear a sound.	
	you can noar a dound.	
		***************************************
i	2. Driving fast is very dangerous.	
١		***********
3	What happens if?	
	Two bicycles move in an opposite direction, collide with each other.	
	coilide with each other.	
100		*****
		**********

### 9 Look at the opposite photo, then choose the correct answer:

- The car has ..... energy that allows it to move on the road.
  - a. light

b. sound

c. kinetic

d. thermal

- 2. If the driver changes the ...... of the car, its kinetic energy will change.
  - a. color

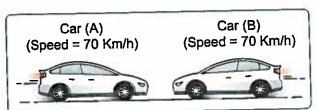
b. speed

c. lights

d. temperature

- 3. All the following actions decrease the dangers that may be caused as a result of the collision, except ......
  - a. increasing the speed of the car.
- b. using the seatbelt.
- c. adding more airbags to the car.
- d. decreasing kinetic energy of the car.

# Look at the following figures which show four similar cars, then choose the correct answer:



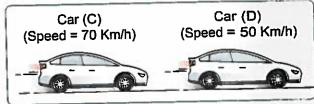


Figure (1)

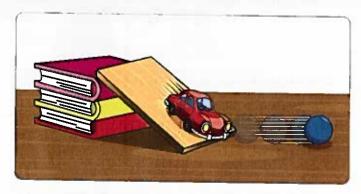
Figure (2)

- 1. The collision that would happen in figure (......) is the most dangerous. (1-2)
- 2. In figure (2), car (......) has the most kinetic energy. (C D)
- 3. In figure (2), car (......) has the least kinetic energy. (C D)

# LESSON FOUR

### **Activity 8 Speed and Collisions**

Look at this picture which represents a toy car collides with a small ball, then choose the correct answer:



- 1. By increasing the speed of the car, the kinetic energy of this car ..... (decreases - increases - doesn't change)
- 2. The ball moves a distance due to ..... of the car.

(force - speed - force and speed)

- ▶ You have learned from the previous lessons that :
  - By increasing the force of an object



The kinetic energy of this object increases.

By increasing the speed of an object



The kinetic energy of this object increases.

· Now, we are going to carry out an activity to show the effect of force and speed of a moving object on its kinetic energy during collision.

### Tools



Ball of modeling clay



Piece of cardboard



Hard surface (wooden table)

Steps	Figure	Observations
<ol> <li>Use the cardboard to make         a landing platform on a hard         surface like a wooden table.</li> <li>Hold the clay ball at a distance         1 meter above the platform.</li> <li>Drop the clay ball lightly onto         the platform without throwing it.</li> </ol>		The shape of the clay ball changes a little and becomes irregular after hitting the platform.
4. Smoothen the clay ball over and lift it up to 1 meter above the platform, then repeat the experiment again, but this time throw the clay ball with a gentle force to increase its speed.		The shape of the clay ball change more and becomes more irregular after hitting the platform.
5. Repeat the experiment one more time and throw the clay ball with a hard force, so its speed increases much more.		The shape of the ball changes much more and becomes completely irregular after hitting the platform.

### Conclusions

- As the force that acts on an object increases, its speed and the amount of its kinetic energy increase.
- As the kinetic energy of a moving object increases, more damage will happen to this object during collision.



### Check your understanding

▶ Put (√) or (x):

By increasing the force on an object, its speed and kinetic energy increases. (

# **Activity 9** The Effect of Mass on Collisions

- ▶ You have learned from the previous lessons the effect of speed on collisions.
- Now, we are going to study the effect of mass on collisions.

# The relation between the mass of objects and their kinetic energy:

- Different vehicles have different masses, where a large truck has a much greater mass than a car.
- If a large truck is traveling at the same speed of a car, the truck has more kinetic energy than the car, so the truck needs a bigger engine than the car.
- As the vehicle moves faster, the amount of fuel that burns inside its engine increases to provide it with more kinetic energy.
- As the mass of an object increases, its kinetic energy increases.
- From the previous explanation, we can conclude that if the truck and the car move at the same speed, we will find that:





#### The truck:

- Has a big mass.
- Has a big engine.
- Uses more fuel.
- Has more kinetic energy.

#### The car:

- Has a small mass.
- Has a small engine.
- Uses less fuel.
- Has less kinetic energy.

# **Give** a reason for:

 The truck whose mass is 1 ton has half the kinetic energy of another truck that has mass 2 tons when they both move at the same speed.

Because if the mass of an object increases, its kinetic energy at the same speed also increases.

### The effect of mass on collisions:

 A large-mass vehicle causes more damage when it hits something than a small-mass vehicle traveling at the same speed.

# What happens if ...?

 A bicycle moving at a speed of 50 km/hr hits a person.
 The bicycle will cause some injuries to this person, but he will survive.



A car moving at a speed of 50 km/hr hits a person.The life of this person may be endangered.



# Check your understanding

- ▶ Put (√) or (x):
  - 1. A big truck has a big mass, while small car has a big engine. ( )
  - 2. If the mass of an object increases, its kinetic energy increases. ( )

# **Activity 10** Energy Conversions During a Collision

- You have learned that when two objects collide with each other, transfer and changes of energy take place such as:
  - When you play a game with marbles, kinetic energy is transferred from your hand to the first marble, then there is another transfer of energy from your marble to the ones you hit.



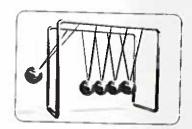
 Some of the kinetic energy is changed into sound energy when you hear the click sound during collisions between marbles.

# Energy conversions during a collision of Newton's cradle:

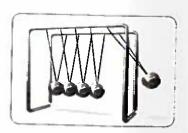
When Newton's cradle ball is raised up without leaving it go, it stores potential energy and doesn't have any kinetic energy.



When you leave the ball to move in the direction of the rest balls, the potential energy decreases gradually and changes into kinetic energy.



Most of kinetic energy in the Newton's cradle is transferred from the first ball to the rest of balls, so the number of balls moving on both sides is equal.



3

In the previous example, some of kinetic energy of the first ball is changed during collision into:

1. Sound energy	2. Thermal energy	3. Other forms of energy
Some of this kinetic energy changes into sound energy that is produced during the collision between balls.	Some of this kinetic energy changes into thermal energy that is produced due to the friction between the string and the other parts of Newton's cradle and also during collision between balls.	Some of this kinetic energy changes into othe forms of energy due to the friction of air with the ball during its movement.

### Notes

- If you leave the moving balls of Newton's cradle long enough, their kinetic energy decreases gradually until they stop after lots of collisions.
- 2. Energy is conserved during collision, so it cannot be destroyed, and the amount of energy before the collision is equal to the amount of energy after the collision.

# Check your understanding

▶ Look at the following picture that shows a car collides with a traffic sign post, then complete the following sentences using these words :

### (thermal - sound)

- A part of energy is changed into energy that you can hear.
- Another part of energy is changed into \_\_\_\_\_ energy due to friction between the car and the traffic sign post.



### **Review on Concept (2.3)**

To review this concept look at the Assessment Book "Part 2: Final Revision".

In the Assessment Book:

#### Try to answer:

- Self-Assessment 25
- Model Exam on Theme (2)

# **Exercises on Lesson 4**

		- walklini)	- nigher	minking Skills	
1	Choose the correct answer :				
•	1. A very big truck needs	to move.			
	a. very small engine		small engine		
	c. very big engine		no engine		
	2. As the force that acts on an		<del>-</del>	o do work	
	a. increases.		decreases.	.o do Work	
	c. doesn't changed.		destroyed.		
-	3. The amount of fuel that is us		<del>-</del>	a certain amount of	
	kinetic energy is the a	mount of fuel (	ised in a smal	I car to get the same	
	amount of kinetic energy.			odi to get the same	;
	a. less than	b. •	equal to		
	c. more than		nalf to		
	4. On a flat road, if a large truc	k is traveling a	t the same sn	eed of a small oor H	
	the truck has		vano odnio op	ccu of a small car, th	iei
	a. more kinetic energy.				
	b. less kinetic energy.				
	c. the same kinetic energy o	f the car.			
	d. no kinetic energy at all.				
	5. When a car stops, all the foli	owing become	zero, excent		
	a. speed. b. kinetic		nass.	d. work.	
(	6. When a moving car decreas	= - 30,500		2000	
	a, its kinetic energy becomes		on στορο, σο .	••••••	
	b. its light energy only becon				
	c. its light energy and therma		me zero.		
	d. its kinetic energy becomes				
7	7. If two objects collide with each				
	energy before collision.		lorgy after co	msion is the	
	a. triple b. double	c. h	alf	d. equal to	
8	3. When two balls are pushed a				
	happens as a result of collision	on of fro	n the right sid	on s ciadie, tris	
	a. one ball		vo balls	С.	
	c. three balls		our balls		

	you move a ball away from the others and do not let it
go, so that is stored	in this ball.
a. your potential energy is	changed into kinetic energy
b. your kinetic energy is c	hanged into potential energy
c. your sound energy is ch	nanged into kinetic energy
d. your sound energy is ci	nanged into potential energy vton's cradle through the balls travels in at each
collision.  a. three different direction b. two opposite directions c. the same direction of m d. the form of chemical en  1. When you throw a ball of a. no damage occurs to t c. energy is destroyed.	novement nergy clay strongly at a wall, there is
d. more kinetic energy  Choose from column (B) w	hat suits it in column (A):
(A)	(B)
Large-mass vehicle     with speed 100 km/hr	a. It has a big amount of kinetic energy.
2. Small-mass vehicle with speed 20 km/hr	b. It has no kinetic energy.
3. Small-mass vehicle that doesn't move	c. It has the most sound energy.
	d. It has a small amount of kinetic energy.
1	<b>3.</b>
Put (/) or (X):  1. A small object moving a	at a low speed has a big amount of kinetic energy. (
	an object doesn't affect its speed.

)

	3. The smaller the mass of the vehicle, the less fuel it consumes.	
	4. Objects of equal masses and move at different speeds have the	(
	amounts of kinetic energy.	same
	5. Speed and mass are the factors that affect the kinetic energy of a object.	( moving
	6. The moving balls in Newton's cradle will stop after lots of collisior their kinetic energy is destroyed.	s because
	7. Some kinetic energy is changed during collisions of balls in Newtinto sound and thermal energies.	on's cradle,
4	8. Among the forms of energy that don't exist in Newton's cradle durare light and chemical energies.	ring collisions (
Z	Correct the underlined word :	
	1. A two-tons truck has smaller amount of kinetic energy than that of one-ton truck moving at the same speed.	
	2. All moving objects always have light energy.	(
1	3. The larger the mass of a car, the less fuel it consumes.	(
	4. The distance that the balls move on the two opposite sides on Ne increases gradually as time passes.	
	5. In Newton's cradle, the kinetic energy of moving balls increases a	()
		/
	6. The number of moving balls at one side on Newton's cradle must	be more than
	those moving at the other side.	()
5	Complete the following sentences :	
	By increasing the force that acts on a moving object, its in causes the increase of its energy.	
(	2. A car moving with speed 50 km/hr has kinetic energy than a truck moving with the same speed.	
	3. In vehicles, the energy that is stored in the fuel changes in energy that allows them to move.	
	4. Most of energy in the Newton's cradle is transferred from t the rest of balls.	he first ball to
	5. When a marble hits another one, some of energy changes energy which you can hear.	into
	6. During collision between Newton's cradle balls, some of er changes into energy due to the between the string	nerav
	other parts of the cradle.  7. Due to of air with Newton's cradle balls, some of e	and the

8. In Newton's cradle, when you rise up one ball, it stores energy that changes into energy when you leave the ball to move.
9. The energy decreases gradually when you leave the moving balls of Newton's cradle long enough until they
Give reasons for:  1. A truck needs a bigger engine than that of a small car to move with the same speed.
2. A car consumes less fuel than that consumed by a bus to move at the same speed.
3. You can hear a sound during collision between marbles.
4. The amount of energy before collision is equal to the amount of energy after collision.
What happens if?  1. The pushing force that acts on an object decreases. (according to its kinetic energy).
The kinetic energy of a moving car increases.  (according to the damage during collision).
3. A truck and a small car move at the same speed. (according to kinetic energy).
4. The Newton's cradle ball is raised up without leaving it go.  (according to its energy).
5. You let the ball of Newton's cradle move towards the rest of balls.  (according to the change of energy)
6. Friction occurs between the string and the other parts of Newton's cradle during collision.  (according to the change of energy)

# Arrange the following sentences to show the steps of collision of Newton's cradle balls in the correct order.

(.....) Kinetic energy is transferred from the first ball to the rest of balls.

(......) Potential energy of the first ball decreases and changes into kinetic energy.

(.....) Kinetic energy of all balls decreases gradually until they stop.

(.....) Raise up the first ball, so it stores potential energy.

# Look at the opposite figure, then choose the correct answer:

- 1. When you push the marble, the ...... energy of your hand transfers to the marble.
  - a. sound

b. thermal

c. kinetic

d. potential

- 2. During collision between your moving marble and other marbles, some of the ...... energy of your marble changes into ...... energy.
  - a. sound kinetic

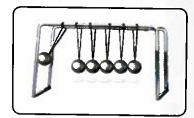
b. kinetic - sound

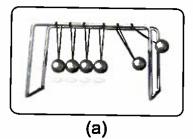
c. thermal - kinetic

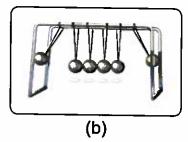
- d. sound potential
- 3. If a marble rolls down a ramp, the speed of the marble decreases by ..........
  - a. decreasing the angle of the ramp.
- b. increasing the angle of the ramp.
- c. increasing the mass of the marble.
- d. decreasing the width of the ramp.

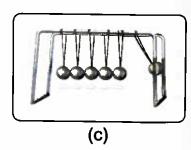
# Look at the opposite figure, then choose the correct answer:

 In the opposite Newton's cradle, the right figure after letting the ball hit the other balls is figure (......).









- 2. What happens if you let the cradle for some time? .....
  - a. The speed of the balls will increase.
  - b. The balls will stop moving.
  - c. The balls will move with the same speed.

# Model 1 Exam

# On Concept (2.3)

Total	mark
1	5

1	(A) Choose the correct answer :		(5 marks)
	1. When a car stops suddenly, the	e passengers move	
	a. backward.	b. downward.	
	c. upward.	d. forward.	
	this object.  a. light and sound energies	b. mass and color	
	c. mass and speed	d. speed and color	
	3. If an object moves down along speed of the object will	a ramp, as the angle of the ramp increa	ses the
	a. increase.	b. not change.	
	c. become zero.	d. decrease.	
	c. more force – more kinetic ed. more force – more potential  (B) Give a reason for the follow  The speed of the ball increase	I energy.	
2	(A) Put (✓) or (X):	N	(5 marks)
		ls in Newton's cradle is changed during o	( )
	into sound and thermal energ	ies.	( )
	2. Speed = Time ÷ Distance.		( )
	3. After car collision, the airbags		
	4. In Newton's cradle as the am distance of the balls increase	ount of the kinetic energy increases, the es.	moving (
	(B) What happens if? Two bicycles move in oppos	site directions collide with each other.	

<ul><li>(A) Correct the underling</li><li>1. All moving objects alv</li></ul>	Unid
	bject doesn't depend on its <u>speed</u> which affects its
3. The number of moving those moving at the o	g balls of Newton's cradle on one side must be more tha
<ol> <li>As the mass of a car i decreases.</li> </ol>	ncreases, the damage that occurs during its collisions
B) Choose from column	(B) what suits it in column (A):
(A)	(B)
1. Kinetic energy	a. form of energy that reaches the ear causing hearing.
Kinetic energy     Potential energy	a. form of energy that reaches the ear causing
(A) 1. Kinetic energy 2. Potential energy 3. Light energy	<ul><li>a. form of energy that reaches the ear causing hearing.</li><li>b. type of energy transferred from one moving ball to</li></ul>

3. .....

2. .....

# Model 2

# On Concept [2.3]

Total	mark
	15

1. A heavy steel ball that swings on a cable and used in destruction of parts of buildings.  2. The process in which two objects bump or crash into each other including an energy transfer.  3. They are present in car airbags and allow them to deflate	.)
buildings.  2. The process in which two objects bump or crash into each other including an energy transfer.	.)
The process in which two objects bump or crash into each other including an energy transfer.  (	
energy transfer.	
	.)
J. Higy aic productifical and an and an and and an and an and an and an and an an and an	)
fast after collision.	
4. The energy that can be heard and usually produced when two	
objects collide with each other.	)
(B) Choose the correct answer:	
1. When the Newton's cradle ball is raised up without	_
leaving it go, its energy is maximum and its	
energy equals zero.	
a. kinetic – potential b. potential – kinetic	
c. kinetic – sound d. kinetic – thermal	
2. When you leave the ball moves in the direction of	
the rest of balls some of kinetic energy of this ball	
changes into and energies.  a sound – electrical b. thermal – kinetic	
d. Sourid Steelings	
c. kinetic – sound d. sound – thermal	
2 (A) Put (V) or (X): (5 mail	 'ks)
1. A smaller and slower object has more kinetic energy than that of a larger and	
faster object.	)
2. In Newton's cradle as the height of the raised ball increases, it stores more	
potential energy.	)
3. When an object decreases its speed gradually, so its kinetic energy decrease	S
gradually.	)
4. Seatbelt is one of the safety equipment in cars.	)

cradle balls in the correct order:  () Potential energy of the first ball decreases and changes into () Kinetic energy is transferred from the first ball to the rest of the	kinetic energy
() Rise up the first ball, so it stores potential energy.	Jans.
() Kinetic energy of all balls decreases gradually until they stop	).
(A) Complete the following sentences:	(5 marks
When a moving car hits a tree, a part of energy of the ca     a energy which you hear it.	r changes into
2. A car covers 80 meters in 4 seconds, so it moves at a speed equa	als m/soc
3. If the mass of a moving object decreases, its kinetic energy will same speed.	at the
4. During a car crash, the is inflated with a gas to provide a s	soft cushion.
(B) Give a reason for the following:	
If two vehicles moves at the same speed, the vehicle with a large more damage than the vehicle with a small mass during collision	ge mass causes on.
	***************************************



SFRIFS

# SCIENCE

Assessment Book

By A Group of Supervisors



# Part 1

### Self-Assessments:

(Page 3)

#### Include:

- Cumulative self-assessments on lessons of each concept.
- Cumulative model exam on concepts.
- A model exam on each theme.
- Questions of the school book on each theme.
- Monthly tests.



Part 2

### Final Revision:

(Page 55)

#### Includes:

Review on each concept.



Part 3

### Final Examinations:

(Page 90)

#### Include:

- El-Moasser final examination models.
- Final examinations of some governorates.



Part 4

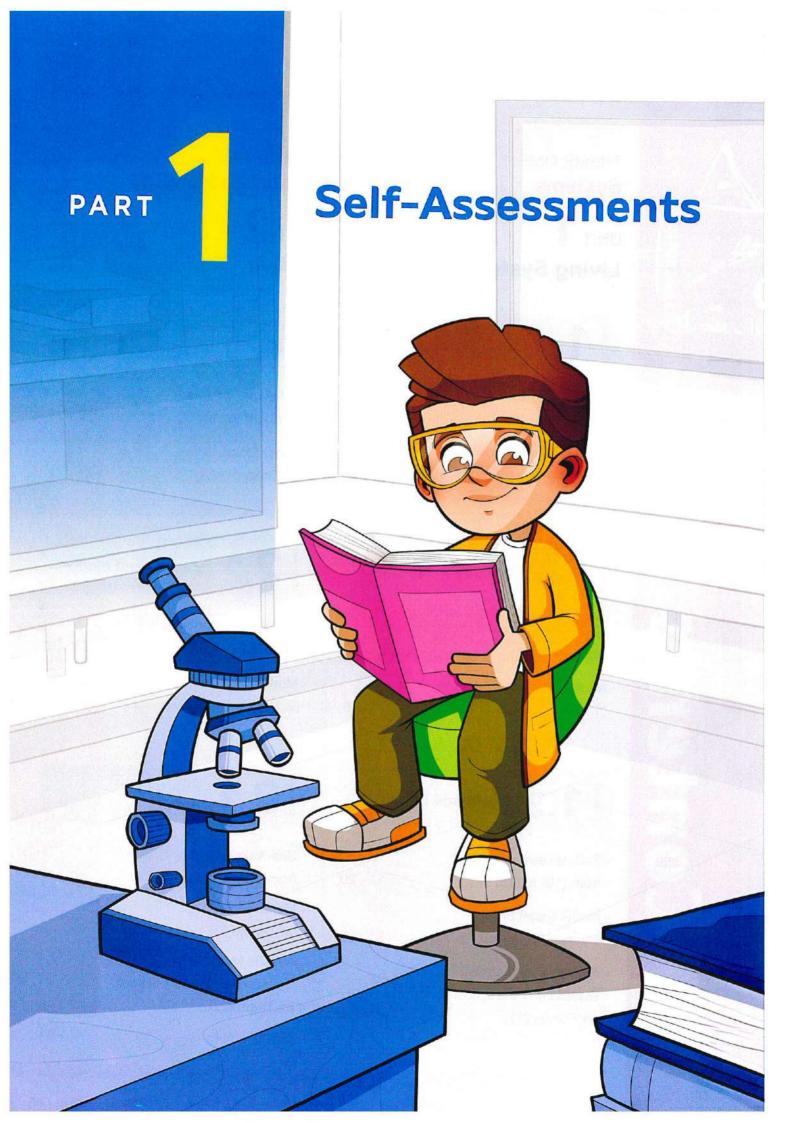
### **Projects**

(Page 121)

#### Include:

- Unit one project.
- Interdisciplinary project.
- Unit two project.





on Theme (1) ....

THEME ONE:	THEME TWO:
Systems	Matter and Energy
UNIT 1	UNIT <b>2</b>
Living Systems	Motion
Adaptation and Survival:	Starting and Stopping:
- Self-Assessments from (1) to (5)5 - 10	- Self-Assessments from (14) to (17) 25 - 30
- Model Exam on Concept (1.1)11	- Model Exam on Concept (2.1)31 - 32
1.2 Senses at Work:	Energy and Motion :
- Self-Assessments	- Self-Assessments
from (6) to (9)12 - 15	from (18) to (21) 33 - 37
- Model Exam on Concepts (1.1) & (1.2)16	- Model Exam on Concepts (2.1) & (2.2)38 - 39
1.3 Light and Sight:	Energy and Collisions:
- Self-Assessments	- Self-Assessments
from (10) to (13)17 - 20	from (22) to (25) 40 - 44
- Model Exam on Theme (1)21 - 22	- Model Exam on Theme (2)45 - 46
- Assess your learning.  Questions of the school book	- Assess your learning.  Questions of the school book on Theme (2)47 - 48

23 - 24

- Monthly tests.....

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# Self-Assessments

on Concept (1.1)

### Self-Assessment 1 On Lesson 1

1 (A) Choose the correct answer:		
Which of the following adaptations help the animal to blend in with its surrounding environment?		
a. Layer of fat.		
b. Color of fur.		
c. Thickness of skin.		
d. Kind of food.		
2. The different colors of fur in different types of bears help them to		
a. respire in their environments.		
<ul><li>b. adapt their habitats.</li><li>c. communicate with other animals.</li></ul>		
d. look for shade areas.		
<ol><li>Which of the following sentences doesn't represent the camouflage adaptation?</li></ol>		
a. Dense feathers of penguins.		
b. White fur of polar bears.		
c. Colored scales of some lizards.		
d. Sandy-colored fur of fennec foxes.		
(B) Give a reason for the following:		
Some types of lizards that live in rocky areas have colorful scales.		
		****
2 (A) Put (V) or (X):		
<ol> <li>Bodies of fennec foxes, penguins and caracals are adapted to live in extreme hot climate.</li> </ol>	(	١
2. Penguins have special blood vessels in their feet that help them survive	1	,
in polar regions.	(	)
<ol><li>The brown fur of the polar bear helps it to blend in with snow.</li></ol>	(	)
(B) What happens if?	3	,
Forest bears are coated with white fur.		

Look at the opposite figures, then answer	the questions below	•
Which figure shows the correct structure of blood vessels in the penguin's feet?		
What will happen if the penguin has     the structure of blood vessels shown in		
figure (a) ?	Figure (a)	Figure (b)
Self-Assessment 2	till Lesson 2	
(A) Complete the following sentences :		
White fur of polar bear is considered as in fennec fox is considered as		while the panting
Chameleon puffs up its body with air for adaptation, while its V-shaped adaptation.		
3. The leaves of tree grow at its eating them, while the leaves of		
(B) What happens if?		
Bull shark has white back and dark belly	<i>t</i> .	
		•••••
(A) Correct the underlined words:		
1. Polar bear has white fur that helps it ble	nd in with the snow as	
its predator.		()
2. Bull shark can live in salt water only.		()
3. Water lily has wide leaves to absorb a la	arge amount of water.	()
(B) Give a reason for the following:		
The shape of pine tree leaves is like a n	eedle.	

B Look at the opposite figure, then answer the following questions:		
Give two examples of animals that live in this habitat.		
2. Give two examples of plants that live in this habitat.		
3. Put (v) or (x):	the same	
1. Some plants of this habitat are characterized by having thick trunk.	(	)
2. Some plants of this habitat have spines on their leaves.	(	)
Self-Assessment 3 till Lesson 3		
1 (A) Choose the correct answer :		
1. The trunk in acacia tree stores as the hump in the camel stores		
a. oil – water. b. water – milk. c. oil – milk. d. water – fat.		
All of the following sentences are correct about stomach, except      a. it has teeth and tongue.		
b. it receives the food from esophagus.		
c. food changes into soupy liquid inside it.		
d. it contains an acid.		
3. All of the following organs belong to the respiratory system, except	•••	
a. nose. b. two bronchi. c. two lungs. d. stomach.		
(B) Give a reason for the following:		
Saliva is very important in your mouth.		
	•••••	•••
2 (A) Put (V) or (X):	-	desc.
1. Caracal and fennec fox can hide in the desert as they have white-colored		
fur.	(	)
<ol><li>Bodies of starred agama and panther chameleon are covered with scales.</li></ol>	(	)
<ol><li>Digestion process begins in the stomach with the help of saliva.</li></ol>	(	)
(B) What happens if?		
The small intestine was not supplied with blood vessels in the human body	<b>'</b> .	
	200	

3 Study the opposite diagram, then answer the questions. Knowir tube (A) air passes, while through tube (B) food passes:	ng that through
1. Tube (A) represents the	Tube (B)
Self-Assessment 4 till Lesson 4	
1. Air is important for human, fish and animals because	out also may gen gas from air
(B) Give a reason for the following:  Air pollution is dangerous for humans, while water pollution is fish and humans.	dangerous for
2 (A) Put (V) or (X):	
1. Human can pollute the environment, but he cannot restore it.	( )
<ol><li>Both lungs and gills are organs that present in the digestive sy human and fish.</li></ol>	stem of both ( )
3. When an ecosystem is completely polluted, no longer organisms of	can live in it. ( )

# (B) Write one animal and one plant that live in each environment of the following :

Environment	Animal	Plant	
1. Desert :			
2. Rainforest :			
3. Polar region :			
4. Salt water :			

		***************************************	
3 Give only one example of	structural adaptation in eac	h of the following:	
	and a day to the time of time of the time of time of the time of the time of time		
			•
2. Fish :			•
3. Polar bear :			
Self-Asse	essment (5) till Les	scop E	
_		55011 5	
(A) Cross out the odd word	l <b>:</b>		
<ol> <li>Frog – Starred agama liz</li> </ol>	ard – Salamander – Toad.	(	.)
2. Water lily – Fish – Palm t	ree – Amphibian.	(	.)
3. Golden frog – Panther ch	ameleon – Kapok tree – Acad	cia tree. (	.)
(B) Give a reason for the fo	llowing:		
Amphibians are endange	red species.		
•••••			
2 (A) Write the scientific term	of each of the following:		
1. A type of living organisms		n water. (	)
2. An organ with structural ac	daptation that enables toad to		5.0)
in water.  3 The grassland habitat of a	occaja traa ja vuhish vus	(	)
<ol><li>The grassland habitat of a amphibians during dry sea</li></ol>		not found (	١
		/	1

(B)	If you are one of the scientists who help amphibians survive.
104 0	You can do all of the following for their habitats, except
	a. removing air pollutants.
	h managing water pollutants

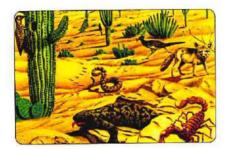
b. removing water pollutants.

c. removing their natural predators.

d. removing water from ponds and streams.

(Give a reason for your choice)

Look at the following two pictures, then answer the questions [by writing habitat (A) or habitat (B)]:



Habitat (A)



Habitat (B)

- 1. Starred agama lizard and fennec fox live in .....
- 2. We can find panther chameleon in .....
- 3. Amphibians cannot live in .....
- 4. Yellow body coats is most common in .....
- 5. Dry seasons is more dangerous for .....
- 6. Cutting down forest usually occurs in .....
- 7. The suitable ecosystem for barbary fig is .....
- 8. Caracal can live in .....
- 9. Arctic fox cannot be found in .....
- 10. Kapok tree can grow in .....

# **Model Exam** on Concept (1.1)



(A) Complete the following se	entences using the words below:	(5 mark
	ssels – expands – cool – mild)	
<ol> <li>During exhalation, the diaph</li> <li>Savannah is a grassland hale</li> <li>The in the gills of fise</li> <li>Give a reason for the follows</li> </ol>	ce for the fennec fox to stay	e body.
(A) Put (S) in front of structura	I adaptation and (B) in front of be	havioral
adaptation for each of the		(5 marks
Bull shark can hunt in salt w	ater and fresh water.	(
2. Black bear has dark fur.	r in i	(
<ul><li>3. Acacia tree uses wind to send messages.</li><li>4. Blood vessels in the penguin's feet.</li></ul>		( (
One of the organs of the dige  (A) Choose from column (B) wh		(5 marks
(A) Living organism	(B) Habitat	
1. Lizard	a. Land and water	
2. Fish	b. Desert	
3. Frog c. Water		
4. Polar bear	d. Arctic region	
2  (B) Write the scientific term of each of the scientific term of the scientif	each of the following :	

# **Self-Assessments**

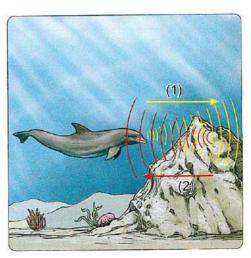
on Concept (1.2)

### Self-Assessment 6 On Lesson 1

1 (A) Complete the following sentences :		
1. Dolphins use property that help them to find the	eir food.	
Human use senses of and when wa     at television.		
Chameleon uses its to see the food, while it to its	stes the food by using	
(B) Give a reason for the following:		
Dolphins can locate their preys under water.		
2 (A) Put (V) or (X):		
1. The owl uses the sense of touch to hunt its prey at night	(	)
2. Fox has good senses of hearing and sight so that it can	avoid danger. (	)
3. A dog uses its sense of smell and sight to identify its ow	ner. (	)
<ul><li>(B) Look at the opposite figure, then answer the followin</li><li>1. Mention the three senses that you use to identify the foci in this picture.</li></ul>		
2. What is the sense used to tell if this food has too much salt or not? And which organ is responsible for it?		

### 3 Observe the following figure, then choose the correct answer:

- 1. Arrow number (1) represents .....
  - a. sound waves produced by the dolphin.
  - b. the echo bounced back from the rock.
  - c. light waves produced by the dolphin.
  - d. light waves produced by the rock.
- 2. Arrow number (2) represents .....
  - a. sound waves produced by the dolphin.
  - b. the echo bounced back to the dolphin.
  - c. light waves produced by the dolphin.
  - d. light waves bounced back to the dolphin.



<ul><li>a. see objects</li><li>b. see objects</li><li>c. locate object</li><li>d. locate object</li></ul>	above the water cts and living org cts and living org	r surface. anisms on the bead anisms under wate	r.		
a. smell.	b. taste.	in the previous pic c. hearing.	ture is thed. sight.		
S	elf-Assessn	nent 7 till l	Lesson 2		
1. An animal that preys is a/an . a. owl.	t flies and depen		of sound to catch its		
		c. bat.	d. dolphin.		
a. Owls	b. Dogs	c. Mongooses	that look like bowls.  d. Chameleons		
thing in common a. live in the sab. feed on the c. depend on a d. depend on g	on as they both ame environment same prey. echolocation propails to breathe.	t. Derty in their hunting	it in size, but they have		
(B) Give a reason	read across the v	A STATE OF THE STA			
······		whole body.			
(A) Put (V) or (X)	:				
<ol><li>The Egyptian n</li></ol>		a group of sounds	s prey through echo. that bounce back	(	)
		e at morning to loo	k for their food.	(	)
(B) What happens The hind legs o	if? of jerboa are shor	t.			

3 Correct the underlin	ed words:			
1. Nerves are importa		digestive system.		()
2. The jerboa's react				()
3. The bat can rotate	its head in all di	rections.		()
_				
Self	-Assessmer	nt 8 till Les	sson 3	
(A) Write the scienti	fic term of each	of the following:		
<ol> <li>The organ which r receptors that are</li> </ol>	found in a jerbo	a's ears.	9	()
2. A system that work	ks inside the boo	ly to keep the orga	nism away fro	om danger. ()
3. The time taken by	an organism's b	ody to react to diffe	rent informat	ion around it. ()
(B) What happens if .	?			
The bat produces	sound waves th	at hit an insect.		
2 (A) Choose the corre	ect answer :			
The nervous system spinal cord and ne	em of , suc	h as elephants and	dogs, consis	sts of brain,
7	o. birds	c. mammals	d. reptiles	
2 are nocturn	nal animals with	bowl-shaped faces	•	
	o. Dogs	c. Mongooses		
3. If you are in your kitchen by using y	room, you can to	ell what kind of food	l is being pre	pared in the
and the second s	o. hearing.	c. touch.	d. smell.	
(B) Give a reason for	the following:			
Dolphins have sha				
		t Illinaturata harriata	a valabitic byo	in processes
3 Order the following running away from	the fox before p	oredating it:	e rappit s pra	iii processes
() The rabbit'	s brain processe	es information.	8	
() The rabbit'	s nerves sent a	signal to the brain.		
() The rabbit	s brain sent a si	gnal to its feet mus	cles to escap	e.
() The rabbit	saw a fox movin	a towards it to dev	our it.	

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## Self-Assessment 9 till Lesson 4

(A) Choose the correct answer	:	
1. In an animal, if the reaction ti	me is very long, so that the	animal
a. will survive.	b. will reproduce.	
c. will be at risk of extinction.	d. will run away quic	kly.
<ol><li>The nervous system plays an</li></ol>	important role in	
a. obtaining energy from food		
b. obtaining energy from oxyg	gen.	
c. absorbing food from small i	ntestine.	
<ul> <li>d. responding to different stim</li> </ul>	nuli.	
<ol><li>If the sensory receptors in the ability to taste food will</li></ol>	tongue are damaged com	pletely, this person's
<ul><li>a. increase.</li><li>b. disappear</li></ul>	c. decrease.	d. not change.
(B) Give a reason for the follow	ing:	
An owl can direct distant sour		
2 (1) 2 (2) (2)		
2 (A) Correct the underlined word		
1. Humpback whales produce lo	w-pitched sound in mating	season. ()
<ol><li>The soldier ants defend their of</li></ol>	community depending on th	neir hearing sense.
		()
3. The bats depend on echolocat	tion to find insects at night	and that is considered
as a behavioral adaptation.		()
(B) What happens if?		
The cane of a blind person pic	ks up echo.	
Place each of the following anin	nals in front of the sentenc	e that describes it:
(Dolphins	- Owls - Jerboas - Bats)	
<ol> <li>They can fly but cannot see we</li> </ol>	ell in the dark.	()
<ol><li>They are rodents that have lon</li></ol>	g hind legs.	()
3. They are nocturnal birds with b	owl-shaped faces.	()
4. They live in water and rely on e	echolocation to find food.	()

#### Total mark

# **Model Exam**

on Concepts (1.1) & (1.2)

		_
4	_	

1 (A)	Put (v) or (x):		(5 marks)		
	Hand-shaped leaves of kapok tree is considered as a structural adaptation. ( )				
		produce high-pitched sound i			
		de frogs, starred agama and			
4. 7	Γhe brain can pro	cess what we hear from our	environment. ( )		
(B)	Cross out the od	ld word:			
		ntestine – Brain – Spinal cord			
2.	Stomach – Diaph	nragm – Esophagus – Large	intestine. ()		
2 (A)	Choose from co	lumns (B) and (C) what suit t	them in column (A): (5 marks)		
	(A)	(B)	(C)		
Li	iving organism	Species	Habitat		
1.	Bull shark	a. Reptile	A. Savannah		
2.	Starred agama	b. Amphibian	B. Salt and fresh water		
3.	Acacia	c. Fish	C. Wet environment		
4.	Frog	d. Plant	D. Desert environment		
	1	. 2 3	4		
(B)	Give a reason fo	r the following:			
	The nurse ants	send smelly messages to sco	out ants.		
3 (A) Complete the following sentences using the words below: (5 marks)					
(penguin – reflex – reaction time – oxygen gas)					
1.	Moving your han	d away when touching a very	hot cup of tea is called		
2. Living organisms need food and to obtain energy.					
3. Among animals that can live in polar environment are and polar bear.					
	<ol> <li>The time taken by a boy to move quickly his hand away, when he touches the spines of a cactus plant is called</li> </ol>				
(B)	Correct the und	lerlined words:			
		take oxygen out of the wate			
2.	The scout ants u	se smelly message to comm	unicate if there is danger nearby.		
			()		

# **Self-Assessments**

on Concept (1.3)

Se	lf-Assessr	ment (10)	On Lesson 1		
1 (A) Put (V) or (X)					
1. Eyes send info	rmation through		orain for processing them at's eyes depends on sou		)
to detect the pr	ey location.			(	)
<ol><li>Fishing cat has</li></ol>	excellent night	t vision better th	an human.	(	)
(B) Give a reason	for the followi	ng:			
The fishing cat's	s eyes pupils o	pen widly at the	low-light places.		
***************************************					٠
(A) Choose from (	olumn (B) wha	it suits it in colu	ımn (A) :		
(A)	SALES ME		(B)	L mark	
1. Fishing cat	a. depends of	on touch to hunt			
2. Human	b. has no mi	rror-like membra	ane at the back of the eye	е.	
			ne at the back of the eye.		
	1		2		-
(B) What happens	if?				
		eye doesn't hav	ve a mirror-like membran	e.	
Choose the correct	t answer:			-	-
			ane like which is found in e correct, <u>except</u> that hur		
a. seem to glow	at night				
b. have excellen	•				
c. don't need nig		es.			
d. need a strong			iaht.		
			human's eyes pu	pils.	
a. equal to			than d. wider than	ono.	
3. Which of the follo			fly but can't see clearly a	it night?	)
a. Fishing cat.	b. Snake	c Bat	d Fennec fox		

<ul><li>a. owls.</li><li>c. panther chame</li></ul>		cats.	
Self	-Assessment (11)	till Lesson 2	
1 (A) Put (V) or (X):			
MOUNTED 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 1	een ball inside a transparent		
<ol><li>Opaque objects a through them.</li></ol>	illow light to pass through an	nd we can see objects (	
500-00-00-00 <del>-0</del> 0-00-00-00-00-00-00-00-00-00-00-00-00	ark room, we can see the tra annot be seen.	ansparent objects but (	
(B) Give a reason fo	or the following :		
You can see clear	rly through air.		
(A) Choose from col	lumn (B) what suits it in col	umn (A):	
(A)	ed to easy more will renke	(B)	
1. Water	a. It is an opaque material, the	at reflects light in different directions.	
2. Glass	b. It is a source of light ene	rgy.	
3. Wood	3. Wood c. It is a transparent material that is used in making w		
d. It is a transparent material which is used for drinki			
1	2	3	
(B) Cross out the od	d word:		
1. Mirror – Cloth – F	Paper – Wood sheet.	(	
2. Wood door – Boo	ok – Wall – Glass cup.	(	
1. Can you see the  2. From this activity  a. water and glas	light from the other side of c , we can conclude that ss are opaque objects.		
D. Water and glac	s are transparent objects.		

### Self-Assessment 12 till Lesson 3

1. Firefly beetles form different flash patterns by using their legs. 2. Speaking is one of the ways to communicate with people. 3. Light energy is not used by humans or firefly beetles for communication.  (B) Give a reason for the following:  The wings of firefly beetles play an important role in the communication between them.  2. (A) Correct the underlined words:  1. Changing the flash patterns of firefly beetles is considered as a structural adaptation.  2. A cell phone is a device that is used in communication between animals.  3. Reading is a type of communication that depends on the sense of taste.  (B) How can firefly insects produce light to communicate with each other?  3. Choose the correct answer:  1 is a type of communication which is used by humans only.  a. Sound b. Light c. Echolocation d. Cell phone  2. Fireflies depend on sense for communication with each other.  a. smell b. taste c. hearing d. sight  3 is considered a type of communication used by animals and humans.  a. Writing b. Displaying light c. Reading d. Cell phone  4. A firefly beetle is a type of	1	1 (A) Put (V) or (X):					
2. Speaking is one of the ways to communicate with people.  3. Light energy is not used by humans or firefly beetles for communication.  (B) Give a reason for the following:  The wings of firefly beetles play an important role in the communication between them.  2. (A) Correct the underlined words:  1. Changing the flash patterns of firefly beetles is considered as a structural adaptation.  2. A cell phone is a device that is used in communication between animals.  (		1. Firefly beetles form different flash patterns by using their legs.		(	)		
3. Light energy is not used by humans or firefly beetles for communication. (  (B) Give a reason for the following:  The wings of firefly beetles play an important role in the communication between them.  2 (A) Correct the underlined words:  1. Changing the flash patterns of firefly beetles is considered as a structural adaptation.  2. A cell phone is a device that is used in communication between animals.  (			33	(	)		
The wings of firefly beetles play an important role in the communication between them.  2 (A) Correct the underlined words:  1. Changing the flash patterns of firefly beetles is considered as a structural adaptation.  2. A cell phone is a device that is used in communication between animals.  3. Reading is a type of communication that depends on the sense of taste.  (		100 (100 to 100	on.	(	)		
1. Changing the flash patterns of firefly beetles is considered as a structural adaptation.  2. A cell phone is a device that is used in communication between animals.  (		The wings of firefly beetles play an important role in the communication	on				
adaptation.  2. A cell phone is a device that is used in communication between animals.  (	2	(A) Correct the underlined words :	***********		_		
2. A cell phone is a device that is used in communication between animals.  (							
3. Reading is a type of communication that depends on the sense of taste.  (B) How can firefly insects produce light to communicate with each other?  1		· · ·			)		
3. Reading is a type of communication that depends on the sense of taste.  (B) How can firefly insects produce light to communicate with each other?  1		2. A cell phone is a device that is used in communication between animals	•				
<ol> <li>is a type of communication which is used by humans only.</li> <li>a. Sound</li> <li>b. Light</li> <li>c. Echolocation</li> <li>d. Cell phone</li> <li>Fireflies depend onsense for communication with each other.</li> <li>a. smell</li> <li>b. taste</li> <li>c. hearing</li> <li>d. sight</li> <li>is considered a type of communication used by animals and humans.</li> <li>a. Writing</li> <li>b. Displaying light</li> <li>c. Reading</li> <li>d. Cell phone</li> <li>d. Cell phone</li> </ol>		3. Reading is a type of communication that depends on the sense of taste (	·				
<ol> <li>is a type of communication which is used by humans only.</li> <li>a. Sound</li> <li>b. Light</li> <li>c. Echolocation</li> <li>d. Cell phone</li> <li>Fireflies depend onsense for communication with each other.</li> <li>a. smell</li> <li>b. taste</li> <li>c. hearing</li> <li>d. sight</li> <li>is considered a type of communication used by animals and humans.</li> <li>a. Writing</li> <li>b. Displaying light</li> <li>c. Reading</li> <li>d. Cell phone</li> <li>d. Cell phone</li> </ol>				•••••	•••		
a. Sound b. Light c. Echolocation d. Cell phone  2. Fireflies depend on	3	Choose the correct answer:					
2. Fireflies depend on		<ol> <li>is a type of communication which is used by humans only.</li> </ol>					
a. smell b. taste c. hearing d. sight  3 is considered a type of communication used by animals and humans. a. Writing b. Displaying light c. Reading d. Cell phone  4. A firefly beetle is a type of		a. Sound b. Light c. Echolocation d. Cell phon	ie				
3 is considered a type of communication used by animals and humans.  a. Writing  b. Displaying light c. Reading  d. Cell phone  4. A firefly beetle is a type of		2. Fireflies depend on sense for communication with each other.					
a. Writing b. Displaying light c. Reading d. Cell phone 4. A firefly beetle is a type of		a. smell b. taste c. hearing d. sight					
4. A firefly beetle is a type of		3 is considered a type of communication used by animals and hu	umans	s.			
		- Maiding					
a. amphibians. b. lizards. c. insects. d. reptiles.		4. A firefly beetle is a type of					
		a. amphibians. b. lizards. c. insects. d. reptiles.					

#### till Lesson 4 Self-Assessment 13

1	(A) Choose the correct answer:		
	1. All of the following use light energy to	send codes, except	
	a. lighthouses.	. traffic lights.	
	c. musical instruments.	. firefly beetles.	
	2. Some living organisms can use light	energy in communication such as	
	a. humans only.	. firefly beetles only.	
	c. humans and firefly beetles.	. bats and firefly beetles.	
	<ol><li>The is the only living organism communicate with each other.</li></ol>	that can use language and speech to	
	a. whale b. owl c.	. firefly beetles d. human	
	(B) Give a reason for the following:		
	In cats' eyes the mirror-like membran dark room.	e cannot make its function in a completely	,
2	(A) Put (✓) or (X):		
	<ol> <li>People who are lost in the desert car of rescue helicopters</li> </ol>	n use mirrors to attract the attention (	
2. Writing is a type of communication that is used by human only.			
	3. Musical instruments cannot be used to send codes for communication. (		
	(B) What happens if?		
	The structure of fishing cat's eyes are	e like that of human's eyes.	
			•••
3	Complete the following table using the	e words below:	
	(communicate – eyes – flash patterns – chemical reaction – mirror-like membra		
	Fishing cats	Firefly beetles	
	There is a special structure known as a presents at the back of their	They produce light, due to the occurrence of a inside their	
	2. This special structure of their eyes	2. They use their wings to form	

to ..... at night.

different ..... that help them

causes ..... and helps them to

..... at night.

# Model Exam on Theme (1)



1	(A) Choose the correct ans			(5 ma	rks)
	1. The light travels in				
	a. circular b. straig	ht c. zigzag	d. curved		
	2. An animal that flies and calan	lepends on the bou	ncing of sound to ca	atch its preys	is
	a. owl. b. snake	c. bat.	d. dolphin	1	
	<ol> <li>The throat is connected to</li> <li>a. esophagus.</li> <li>b. trache</li> </ol>		ighntestine. d. anus.		
	<ul><li>4. Barbary fig keeps animals</li><li>a. long leaves.</li><li>b. smell</li></ul>		rees by itsspines. d. poison.		
	(B) Give reason for the follo	wing:			
	Firefly beetles can produc	e flash patterns.			
	······································			••••••	
		······································		•••••	•••
2	(A) Put (✓) or (X):			(5 mar	ks)
	1. Both of fishing cats and h	umans have an exc	ellent night vision.	(	)
	2. Penguin's body is covered body warm.	with dense feathers	and a thick layer of	fat to keep its	)
	3. The scout ants use smelly r	nessage to communi	cate if there is dange	er nearby. (	)
	4. Salamanders and fish car			(	)
	(B) What happens if?			,	•
	The hind legs of jerboa are	e short.			
					g:
3	(A) Complete the following:	sentences :			
	Fishing cats have a mirror		he back of their	(5 mark	(5)
	2. A burrow is an excellent pl				
	3. The kapok tree spreads sr				
	4. Humpback whales produce			<b>а</b> Э Ц.	
		Now pitched soullo	ı III Season,		

## (B) Using the following table, mention the name of the tube-shaped organs of the digestive and respiratory systems our bodies:

(A)	(B)		
Organ (1):	through which food passes to the stomach.		
Organ (2):	in which the absorption of nutrients takes place.		
Organ (3) :	it ends with anus.		
Organ (4):	it connects the throat with the two lungs.		

## **Assess Your Learning**

## Questions of the School Book on Theme (1)

Choose the correct answer:		
1is considered as a behavior	al adaptation in liv	ing organisms.
a. Long ears	b. Living in burro	
c. Big eyes	d. Countershadir	ng
2 is considered as a structura	l adaptation in livir	ng organisms.
a. Birds migration	b. Panting	
c. Brown fur	d. Puffing up the	body to appear bigger
The following animals are structurated except		
a. penguin. b. fennec fox.	c. arctic fox.	d. polar pear.
4. Some plants have very wide leave	s in order to	
<ul> <li>a. prevent their tearing off due to w</li> </ul>	vind.	
b. prevent animals from eating the	m.	
c. reduce water loss.		
d. get more sunlight.		
5. Which of the following groups refle	cts light well when	it falls on them?
a. Mirror – Wooden board – Metal	spoon.	
b. Metal spoon – Cardboard box –	Mirror.	
c. Mirror – Aluminum foil – Metal spoon.		
d. Aluminum foil – Brick – Mirror.		
6. The feature of light, helps to	see yourself in the	e mirror.
a. refraction b. reflection	c. absorption	d. density
7. When exposing to danger, the	system helps to	recognize it and avoid it.
a. circulatory b. digestive	c. respiratory	d. nervous
Compare between each of the follow	ving :	
<ol> <li>The inhaled air and the exhaled air</li> </ol>		
2. Structural adaptation and behavior	al adaptation of a l	iving organism.
3. Communication ways in humans ar		

3 Put (✓) or (X):		
1. Your sense of hearing allows you to see the light of a flashlight.	(	)
<ol><li>The stomach is an important organ in the digestive system.</li></ol>	(	)
<ol><li>Your sense of touch allows you to feel the heat of a stove.</li></ol>	(	)
4. The esophagus is an important organ in the respiratory system.	(	)
<ol><li>The ear is the organ of feeling that allows you to hear birds singing.</li></ol>	(	)
<ol><li>The lungs are important organs in the respiratory system.</li></ol>	(	)
<ol><li>The eye is the organ of feeling that allows you to taste the bitterness of a lemon.</li></ol>	(	)
8. The heart is an important organ in the nervous system.	(	)
9. Skin is the sensory organ that allows you to feel the softness of the fabric.	(	)
10. The diaphragm is an important organ in the digestive system.	(	)
1. The sense of allows you to notice noise, the sends a signal the nerves. The signal goes to the, and you interpret that sound as t song of a bird.		gh
<ol> <li>The system that digests food to produce energy is the and one of the most important organs in this system is the, while the system that is responsible for providing the body with oxygen is the</li></ol>		
Answer the following questions:  1. Why does night vision differ between cats and humans?		
Bats cannot see in the dark, but they can hunt their preys at night.  (Give a re	eas	on)

## **Self-Assessments**

on Concept (2.1)

Self-Assessment 14 On Lesson 1	
1. (A) Put (V) or (X):	
The engine of a normal truck is the same engine of a rocket.	/ )
2. Engineers use the same idea of rocket design in stopping the St	( ) ockwaye truck
	( )
<ol><li>You need energy to make a force to move a chair from one place to</li></ol>	another.
(B) Give a reason for the following:	
By increasing the number of fire extinguishers,	
the distance that the cart moves will increase.	
	73
	35
(A) Chaosa from column (B) what with it is	
2 (A) Choose from column (B) what suits it in column (A):	
(A) (B)	renew.
Normal engine     a. is used in stopping both of the	
Jet engine Shockwave truck and rockets.	
3. Parachute b. is used in moving a normal truck.	
c. is used to stop a normal truck.	
d. is used in moving the Shockwave tr	uck.
1	
(B) Which is faster, a normal truck or the Shockwave truck ?	
(Give a reason for your answer).	
	***************************************
This nicture represents one of the most nevertile at 15	
This picture represents one of the most powerful and fastest trucks  1. What is the name of this truck?	in the world:
TO What is the Harrie of this truck?	
2 10/15 at 15 are 25 (1)	
2. What happens if the three jet engines of this truck	
are replaced by the engine of a normal truck?	

## Self-Assessment (15) till Lesson 2

(A) Choose the correct answer:	100
1. A book is placed on a table is affected by	
a. gravity pulling force only.	
b. table pushing force only.	
c. table pulling force and gravity pushing force.	
<ul> <li>d. table pushing force and gravity pulling force.</li> </ul>	
2. When you sit on a chair which of the following sentences is correct	?
a. gravity pulling you upward.	
b. gravity pulling you downward.	
c. chair pulling you upward.	
d. chair pushing you downward.	
3. We can see all the following motions, except	
a. the rotation of Earth around the Sun.	
b. a person crossing the road.	
c. a person riding a bicycle.	
d. a person swimming in the sea.	
(B) What happens if?	
The pulling force of one of the two teams in tug-of-war game becor	nes greater
than the other team.	
3 (A) Compat the underlined words t	
<ul><li>(A) Correct the underlined words:</li><li>1. To move up any object from the ground, the pulling force of your</li></ul>	
hand must be smaller than the pulling force of the gravity.	()
2. In tug-of-war game, the winner team is the team with the weaker for	
2. III tug-oi-war game, the winner tourn to the tourner tourner tourner tourner to the tourner	()
3. You can stop the ball that is thrown toward you by the pulling	
force of your hands against the ball movement.	()
(B) Give a reason for the following:	
Parachutes are used in the Shockwave truck and rocket.	

#### B Look at the following pictures, then choose the correct answer:







Picture (2)

#### Self-Assessment 16 till Lesson 3

d. weaker than

#### (A) Complete the following sentences:

c. equals to

- There are two forces act on any object stands on a table which are the ......

  force of the table and the ...... force of the gravity.
- 2. You cannot lift up a bag from the ground if the pulling force of your hand and the pulling force of gravity are ......
- When you stop pedalling during the movement of the bicycle, its speed decreases gradually until it stops, due to the effect of ...... force.
- (B) In the opposite figure, if we affect on these two toy cars by the same force :

Why the car (B) moves for a longer distance than the car (A)?

Original position

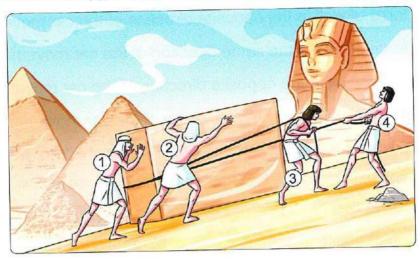
A

50 m

2 (A) Put (V) or (X):		
1. The Shockwave truck has only one jet engine that makes it faster than	the	
normal truck.	(	)
2. The reason for stopping a toy car moves on a table is the friction between	en	×.
the toy car and the table surface.	(	)
3. We can stop the motion of the Shockwave truck by using parachutes.	(	)
(B) What happens if?		
A toy car and a toy truck are affected by the same pushing force.		
		•••
3 Look at the opposite figure that shows the movement of a ball pushed	up wit	n
your hand, then answer the questions:		
(A) Put (✓) or (X):		_
1. The ball moves from point (1) to point (2) due	<b>)</b> -\	
to the hand pulling force.	1	
2. The ball moves from point (2) to point (3) due		
to the gravity pulling force.	9	1
3. At all points, the ball is affected by the friction		
force of the air.		
(B) Complete the following sentence:		
The ball moves from point to point in a direction opposi	te to th	е
direction of the gravity.		
Self-Assessment 17 till Lesson 4		
1 (A) Choose the correct answer:		
1. When a toy car moves faster than a toy truck, this means that the toy	car do	
work that of the toy truck.		
a. more than b. less than c. equal to d. half to		

2. The reason for stopping a toy car craches the wall is the					
	<ul> <li>a. pushing force of wall in the opposite direction of the car movement.</li> </ul>				
b. pushing force of wall in the same direction of the car movement.					
c. pulling force of wall in the opposite direction of the car movement.					
	d. pulling force of wall in the same direction of the car movement.				
3. In tug-of-war game, if the first group co					
group contains nine children, this mear	ns that the forces act on the rope are				
of each other.					
a. balanced in opposite directions	b. unbalanced in opposite directions				
c. balanced in the same direction	d. unbalanced in the same direction				
(B) Give a reason for the following:					
Any body moves on the ground is usua	lly affected by a force opposes its				
direction of movement.					
2 (A) Correct the underlined words :					
	able in that the country of the coun				
<ol> <li>The reason for standing of a cup on a tailing is more than the pulling force of gravity.</li> </ol>	1987				
2. The work done by the football is always	()				
transferred from the player foot to the ba					
3. If the same force is applied on a large ba	()				
ball moves a distance longer than the sn					
	nall hall /				
	mall ball. ()				
(B) Give a reason for the following:					
(B) Give a reason for the following:	<b>(</b>				

## 3 The pharaohs built the pyramids, and this work took many years of work:



(A)	Find	out	from	the	D	icture	
1/3/	IIIIM	Out					-

1. Two persons pull the heavy stone.	
	)
2. Two persons push the heavy stone.	1 10
3. The type of force between the stone and the ground.	)
(B) Put (✓) or (X):	
1. If the large stone moves from its place, this means that there are balanced	
forces acting on it.	)
Big stones need more force to move them than smaller ones.	)
3. The work done is equal to the amount of energy transferred by a force	
that is used to move the stone.	

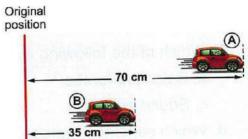
# **Model Exam** on Concepts (2.1)



(A) Choose the co	rrect answer:		(5 mark
<ol> <li>Which of the fol</li> </ol>	lowing do you use to	o kick a ball with your le	eg ?
a. Pull force.		c. Sound energy.	d. Light energy.
<ol><li>When an object</li></ol>	is in motion, this me	eans that itsch	nanges.
a. color	b. shape	c. position	d. size
<ol><li>Which of the foll</li></ol>	owing will cause an	object to move ?	
<ul> <li>a. Balanced force</li> </ul>		b. Unbalanced force	
c. Sound energy	<i>(</i> .	d. Light energy.	
<ol><li>Which sentence</li></ol>	represents the best	t example of gravity?	***************************************
a. A car hits a tre	ee, and its motion st	ops.	
b. A wind blows,	and a sailboat mov	es.	
c. A book is push	ned, and it moves a	cross a table.	
	s a ball, and it falls t		
(B) What happens i		-	
The Shockwave	driver opens the pa	rachutes.	
2 (A) Put (V) or (X):			(5 marks,
		nergy than pushing a tr	uck. ( )
<ol><li>You need energy</li></ol>			( )
3. Using a remote c	ontrol of television r	needs a pushing force t	hat acts on its
buttons.			( )
<ol><li>When a car crash</li></ol>	ies into a wall, it will	not stop.	( )
(B) Give a reason for	r the following:		
	ruck is faster than th	ne normal truck.	
3 (A) Complete the fo			(5 marks)
<ol> <li>The work done by from the player ha</li> </ol>	a basketball is equund to the ball.	al to the amount of	transferred
<ol><li>If the same pulling other, the smaller</li></ol>	force acts on two box will move for a	ooxes, and one of them	is larger than the

- 3. When you lift up an object from the ground, there are two forces act on it, which are the ...... force of your hand and ..... force of the gravity.
- 4. We can say that the object is in motion relative to a ..... starting point.
- (B) The following figure shows two similar toy cars:
  Which of these two cars is affected by a greater force?

(Give a reason for your answer).



## **Self-Assessments**

on Concept (2.2)

### Self-Assessment 18 On Lesson 1

1 (A) Choose the correct answer:			
1. The roller coaster moves up the h	hill due to the effect of		
a. balanced force.	b. sound energy.		
c. kinetic energy.	d. gravity force.		
2. When the roller coaster stops, its			
a. doesn't change.	b. increases.		
c. decreases.	d. becomes zero.		
3. The kinetic energy of a car increa	ases by		
a. decreasing its speed.			
b. increasing its speed.			
c. keeping its speed without chan	ging.		
d. decreasing the pushing force a	cts on it.		
(B) What happens to?			
The energy of a roller coaster who	en it moves from up to down.		
	•••••••••••••••••••••••••••••••••••••••		
2 (A) Put (V) or (X):			
1. Objects that don't move have no			u.
	7.5	(	)
2. As the roller coaster moves up a h		(	)
<ol><li>Any stopped object that is put at a has potential energy.</li></ol>	ringri place from the Earth's surface	,	,
(B) Give a reason for the following:		(	)
A sand surfer moves very fast down			
A saind surier moves very last down			
	(according to the change of	energ	Jy).
			•••
Look at the following figure, then co			
The bicycle stores energy when it not be point.  The point to point to point.  The point to point to point.	noves	And the second	
from point to point	The state of the s		
when it moves from point			
to point	Marie Control of the	The Co	
3. The energy of the bicycle	will	Why?	
by increasing its speed.	* NX(4)	SAME PAR	

### Self-Assessment (19) till Lesson 2

1	(A) Choose the corr	rect answer:				
	1. You do work in a	II the following	situations, except			
	a. pushing a woo	den box for a	distance.			
	b. throwing a sto	ne for a distan	ce.			
	c. lifting a bag up	for a distance	i.			
	d. pulling a big tr	ee which does	n't move.			
	2. A flying airplane	in the sky has				
	a. potential energ	gy only.				
	b. kinetic energy	only.				
	c. both potential	and kinetic en	ergies.			
	d. neither kinetic	nor potential	energies.			
	3. You can see all o	of the following	, except			
	a. the light of the	Sun.	b. the reflecte	ed light from the n	noon.	
	c. the light of the	candle.	d. the sound	of a radio.		
	(B) Give a reason f	or the followin	ng:			
	The state of the s		owards, its potentia	al energy increas	es.	
						_
2	(A) Put (✓) or (X):		Sa.		,	`
	1. Sound energy ca				(	)
	2. Work is a force t				(	)
	3. No work is done	if a force is ap	plied but the object	ot doesn't move.	(	)
	(B) What happens	if?				
	A ball falls from y	our hand towar	ds the ground.(acc	ording to the chan	ge of energ	y).
						•••••
3	Look at the oppos	ite figure, the	n choose the corre	ect answer :		
	1. In figure (1), the					
	a. kinetic	b. thermal			THE PARTY OF THE P	
	c. potential					
	2. In figure (2), the		gy of the ball	(g)		
	is changed into				<b>66</b>	
	a. kinetic	b. light		Figure (1)	Figure (2)	
	V	- N		Figure (1)	Figure (2)	

d. thermal

c. sound

### Self-Assessment 20 till Lesson 3

(A) Choose the correct answer:					
	olaced inside a flashlight can be chan	ged into	)		
a. sound and light b. electrical and chemical					
c. light and thermal	d. chemical and kinetic				
<ul> <li>2. A bird flying in the sky has</li></ul>	ergies.				
3. When a spring is compressed, it	t stores enerav.				
a. chemical	b. potential				
c. thermal	d. light				
(B) Give a reason for the following	g:				
The stored potential energy in a of a hill.	battery differs from that of a ball at the	∍ top			
2 (A) Put (V) or (X) :			····		
1. Some forms of energy can be cr	eated and also can be destroyed	1	)		
2. There is only one form of energy		(	)		
3. Batteries stores electrical energy		ì	)		
(B) What happens to?			•		
Changes of energy when throwing	ng a ball upwards.				
You have three devices (A), (B) and		1995			
- Device (A) changes chemical ene	ergy into light and thermal energies.				
- Device (B) changes electrical ene					
- Device (C) changes chemical ene	ergy into thermal energy.				
Choose correct answer :					
1. Device (A) may be					
a. a flashlight.	b. a television.				
c. an electric heater.	d. a radio.				

1	2. Device (B) may be				
	a. an electric heater.	b. an electric lam	ıp.		
	c. an electric fan.	d. a radio.			
	3. Device (C) may be				
	a. a gas oven.	b. an electric fan			
	c. an electric mixer.	d. a radio.			
	Self-Assessmen	nt 21 till Le	esson 4		
1	Choose the correct answer :				
	Both food and batteries,				
	a. store mechanical energy.	b. store chemica	al energy.		
	c. produce chemical energy.	d. produce light			
	2. Both radio and television				
	a. are operated by gravitational er	nergy.			
	b. are operated by mechanical en				
	c. produce sound energy.				
	d. produce chemical energy.				
	3. Electric heater produces	energy.			
	a. electrical b. sound	c. thermal	d. light		
2	(A) Put (✓) or (X):				
	1. The energies produced from telev	rision are sound a	nd light.	(	)
	2. There are some forms of energy,			(	)
	(B) You have four objects (A), (B), (C		HOW that.		
	- Object (A) can't move but can prod	duce sound.			
	<ul> <li>Object (B) is an apple.</li> </ul>	mal energies			
	<ul><li>Object (C) produces light and ther</li><li>Object (D) doesn't produce light en</li></ul>				
	= Object (b) doesn't produce light of	norgy.			
Ch	oose correct answer:				
	1. Object (A) may be	The same of the sa			
	a. an electric lamp.	b. a radio.			
	c. food.	d. a flashlight.			
	2. Object (B) stores energy.		The state of		
	a. mechanical b. thermal	c. chemical	d. light		

3. Object (C) may be						
	a. an alarm bell.	b. a radio.	c. food.	d. the Sun.		
	4. Object (D) may	be				
	a. the Moon.	b. the Sun.	c. flashlight.	d. electric lamp.		
3	Look at the follow	ing figure, then	choose the correct	t answer :		
	1. Wires inside the					
	a. sound		b. light			
	c. electrical		d. chemical			
	2. Which part inside	e the flashlight s	stores chemical ene	rgy ?		
	a. Battery.		b. Wires.			
	c. Lamp.		d. Its body.			
	<ol><li>Which form of er</li></ol>	nergy in the flas	hlight you can see ?	·		
	<ul> <li>a. Electrical ener</li> </ul>		b. Light energy.			
	c. Thermal energ	IV.	d. Chemical ene	erav.		

## Model Exam on Concepts (2.1) & (2.2)



1 (A) Choose the correct answer:	(5)	marks)
1. All the following objects are affected	d by unbalanced forces, except	
a. a person sitting on a chair.		
b. a ball moves on the ground.		
c. a plane flying in the sky.		
d. a person jumps up in the air.		
2. When we turn on a television,	and energies are produced.	
a. sound - chemical	b. light - chemical	
c. sound – light	d. solar - light	
3. By increasing and	, the potential energy increases.	
a. mass – weight	b. mass – height	
c. mass - speed	d. height – speed	
<ol> <li>If we fix some fire extinguishers on the cart move forward.</li> </ol>	to a cart, the air that moves mal	ces
a. forward	b. upward	
c. downward	d. backward	
(B) What happens if?		
A child moves down along the slide	e. (concerning the change of end	ergy).
2 (A) Put (V) or (X):	(5	marks)
1. Sound energy is a form of potentia	l energy.	( )
2. We can say that a body is in motion		
to a moving point.		( )
3. Food provides our bodies with ene	ergy.	( )
4. There is a work done, when you p		
of a computer.		( )
(B) Give a reason for the following:		
We can't live without eating food.		

#### (A) Complete the following sentences using the words below:

(5 marks)

#### (long - potential - gravity - work)

- 1. When a ball is pushed up in the air, the ball stores ..... energy.
- 2. If a pushing force is applied on a chair to move it, so a ...... is done.
- 3. The water in waterfall falls down into the lake due to the effect of .....
- 4. When you kick a ball on the ground hardly, it will travel a ...... distance.

#### (B) Look at the opposite figure, then answer the following questions:

- 1. What is the name of this truck?
- 2. What happens if this truck is not provided with parachutes?



## **Self-Assessments**

on Concept (2.3)

#### Self-Assessment 22 On Lesson 1

(A) Choose the correct answer:		
1. When a fast car hits a very big stone		
situations may happen, except		
a. the speed of the car becomes zer		
b. the energy of the car transfers to		
c. the airbags are inflated and filled		
d. the car keeps moving and its spec		
<ol><li>The safety equipment that play an ir includes</li></ol>	mportant role during collisions between o	ars
a. airbags only.	b. seatbelts only.	
c. airbags and seatbelts.	d. car tires and steering wheel.	
During collision, all the following situations cars, except it will	ations may occur to the speed of the crash	ned
	c. become zero. d. remain as it is.	
(B) Give a reason for the following:		
	rough their holes as fast as they inflate.	
(A) Put (🗸) or (X) :		
1. Hitting a cricket ball with the bat ca	uses a change in its speed and	
its direction.	(	)
2. The wrecking ball is used to destru	ct walls of buildings. (	)
3. Transfering of kinetic energy occurs	s only through moving object to an	
object that doesn't move, when the		)
(B) What happens if?		
The sensors of the car airbags detec	t a strong crash with the car's body.	
Complete the following paragraph us	sing the words below :	
	– kinetic – car)	
	ycle, the car transfers its energy	,
to the bicycle, so the bicycle moves in	adirection and is more damage	ed
than the		

#### Self-Assessment 23 till Lesson 2

1 (A) Choose the correct answ	wer:		
When a train travels 600 the train?	kilometers in 6	hours, what is the	speed of
a. 50 km/hr. b	. 100 km/hr.	c. 150 km/hr.	d. 200 km/hr.
Which of the following sp collision ?	eeds is the mo	st dangerous on the	e driver's life on
a. a car moves at 25 km/	hr.	b. a car moves a	it 50 km/hr.
c. a car moves at 75 km/	hr.	d. a car moves a	it 100 km/hr.
The kinetic energy of an that of the same	object sliding d object when sli	own on a ramp from ding another ramp f	height 2 meters is From height 4 meter.
a. less than b.	more than	c. equal to	d. faster than
240 kilometers in 4 hou			
2 (A) Put (V) or (X):	11		
1. When the kinetic energy of	of a moving bod	y increases, its spee	ed decreases. ( )
2. When the mass of an obj			
3. Airbags slow the speed o	f the passenge	rs' motion forward.	( )
(B) What happens if?			
The speed of a moving obj			o its kinetic energy).
Choose from column (B) wh	at suits it in co	lumn (A) :	
(A)		(B)	
1. Speed	a. the speed of	an object moves do	wn on it increases.
<ul><li>2. Kilometer per hour</li><li>3. The angle of</li></ul>	b. it is the dista amount of ti	ance that an object t me.	ravels in a certain
inclination increases		ng unit of distance. ng unit of speed.	
1	2	3	

#### Self-Assessment 24 till Lesson 3

(A) Choose the correct answer:						
<ol> <li>A wooden box that doesn't move, gains the largest amount of kinetic energy when a moving car with a speed equals hits this box.</li> </ol>						
a. 30 km/hr. b. 50 km/hr.	c. 80 km/hr.	d. 120 km/hr.				
<ol><li>If a car carries a heavy mass, the driver of collisions.</li></ol>	must move	to avoid dama	ges			
a. with a slow speed	b. with a high s	speed				
c. with a low potential energy	d. with a high p	ootential energy				
3. When a fast moving truck collide with a senergy of the truck	al energies. small car. d. noves down a rar					
2 (A) Put (✓) or (X):	المائد ال	went anada haya				
Objects that have the same masses an	a move with diffe	rent speeds, nave.	( )			
the same amount of kinetic energy.  2. When a vehicle with a high amount of k	inetic energy col	lide with a standing	. ,			
person, the vehicle pushes the person			( )			
3. If a collision happens between two light						
in the same direction, a small amount of			( )			
(B) Give a reason for the following:  The kinetic energy of an object that moincreasing the angle of the ramp.	ves down a ram	p increases by				

#### 3 Look at the opposite graph, then choose the correct answer:

- 1. Which car has the most kinetic energy? ......
  - a. A
- b. B
- c. C
- d. D
- 2. Car (D) has kinetic energy more than car .....
  - a.A
- b. B
- c. C
- d. D

Car

Speed (km/hr.)

100 -

60

40

20

- 3. If a collision occurs between car ...... and a wall, it will cause the most damage.
  - a.A
- b. B
- c. C
- d. D
- 4. If a collision occurs between car ...... and a wall, it will cause the least damage.
  - a.A
- b. B
- c. C
- d. D

#### Self-Assessment 25 till Lesson 4

#### 1 (A) Choose the correct answer:

- If there is a collision between two large-mass objects at high speeds, and another collision between two small-mass objects at low speeds, so ..............
  - a. both collisions don't cause any damage.
  - b. both collisions cause the same amount of damage.
  - c. the first collision causes more damage than the second collision.
  - d. the first collision causes less damage than the second collision.
- 2. After collision, the distance that the last ball move on the other side of the Newton's cradle, depends on ......
  - a. the stored sound energy in it.
  - b. the stored kinetic energy in it.
  - c. the kinetic energy that is transferred from the previous balls.
  - d. the electrical energy that is transferred from the previous balls.
- 3. If a moving car makes a collision, which of the following speeds causes the lowest amount of damage to that car?.....
  - a. 60 km/hr.
- b. 75 km/hr.
- c. 80 km/hr.
- d. 50 km/hr.

#### (B) Give a reason for the following:

A sound can be heard during the collision between the Newton's cradle balls.

2	(A)	Put	(V)	or	X	):

- 1. When you raise up a ball in the Newton's cradle, it stores thermal energy. ( )
- Large-mass vehicle and small-mass vehicle, have the same kinetic energy when they move with the same speed.
- 3. If you drive at a high speed, you have to stop gradually to avoid pushing forward inside the car.

#### (B) What happens if ...?

You leave the moving balls of the Newton's cradle move for a long time.

(according to their energies).

B Look at the opposite photos, then choose the correct answer:



Train speed = 90 km/hr.



Truck speed = 90 km/hr.

- 1. Kinetic energy of the train is ..... that of the truck.
  - a. less than
- b. more than
- c. equal to
- d. half to
- 2. During collision, the train causes more damage than the truck as it has ......the truck.
  - a. more mass than

b less mass than

c. equal mass as

- d. half the mass of
- 3. All the following sentences are correct, except
  - a. the train has the most mass.
  - b. the train and the truck have the same speed.
  - c. the truck has the most mass.
  - d, the truck has the least kinetic energy.

# Model Exam on Theme (2)



(A) Choose the correct answer :	(5 ma	arks)
1. When you move something toward you, this represents		
a. pushing force. b. light energy.		
c. pulling force. d. sound energy.		
2. The roller coaster has the most energy of motion,		
a. when it goes up to the top of the hill.		
b. when it goes down the hill.		
c. when it stops at the top of the hill.		
d. when it stops at the bottom of the hill.		
3. Which of the following sentences describes the friction force?		
a. It pulls objects toward the ground.		
b. It pushes objects away from the ground.		
c. It doesn't affect objects in motion.		
d. It slows down or stops objects in motion.		
4. The object that has the most kinetic energy, is object.		
a. the fastest and lightest  b. the slowest and lightest		
c. the fastest and heaviest d. the slowest and heaviest		
(B) Give a reason for the following:		
The Shockwave truck is faster than the normal truck.		
	······································	
2 (A) Put (V) or (X):	(5 mar	rks)
1. If two objects travel for equal amount of time, the object that travels a lo		
distance has a slower speed.	(	)
2. When a cricket bat hits the ball, its potential energy transfers to the ball.	ì	)
3. The main difference between pulling and pushing forces is the direction		,
the force.	(	)
<ol> <li>You can change kinetic energy into stored potential energy, when you compress a toy spring.</li> </ol>	•	
(B) What happens if?		
The airbags in a car don't inflate during a crash.		
	nul —	
		95) Sta

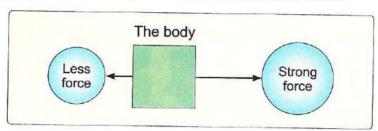
3	(A) Write the scientific term of each of the following:	(5 marks)
	1. A force that you make to change the direction of an object away	
	from you.	()
	2. The form of energy that increases when the speed of an object	
	increases.	()
	<ol><li>The distance that an object travels in a certain amount of time.</li></ol>	()
	4. Safety equipment used to prevent car passengers from moving	
	forward, when the car stops suddenly.	()
	(B) Cross out the odd word:	
	Electrical energy - Chemical energy - Thermal energy - Sound	energy.
		()

### **Assess your Learning**

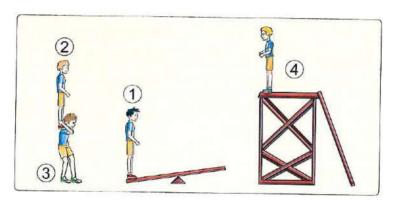
#### Questions of the School Book on Theme (2)

#### 1 Choose the correct answer:

1. In the following figure, the body is under the effect of ..........



- a. balanced forces and moving to the right.
- b. balanced forces and moving to the left.
- c. unbalanced forces and moving to the right.
- d. unbalanced forces and moving to the left.
- 2. In the following figure, which one of the players has the greatest potential energy? ......



- a. Player (1).
- b. Player (2).
- c. Player (3).
- d. Player (4).
- 3. The energy gained by a ball when it falls from a high place is ..... energy.
  - a. potential
- b. kinetic
- c. light
- d. chemical
- 4. If the angle of inclination of a surface increases, so the speed of the rolling body ...........
  - a. decreases.
- b. increases.
- c. is not affected. d. equals zero.
- 5. When a collision occurs, the sum of the energies before the collision is .......... the sum of the energies after the collision.
  - a. equal to
- b. less than
- c. more than
- d. not equal
- 6. When a moving car stops suddenly, the passenger's body moves ......
  - a. to the right direction.
- b. to the left direction.

c. forward.

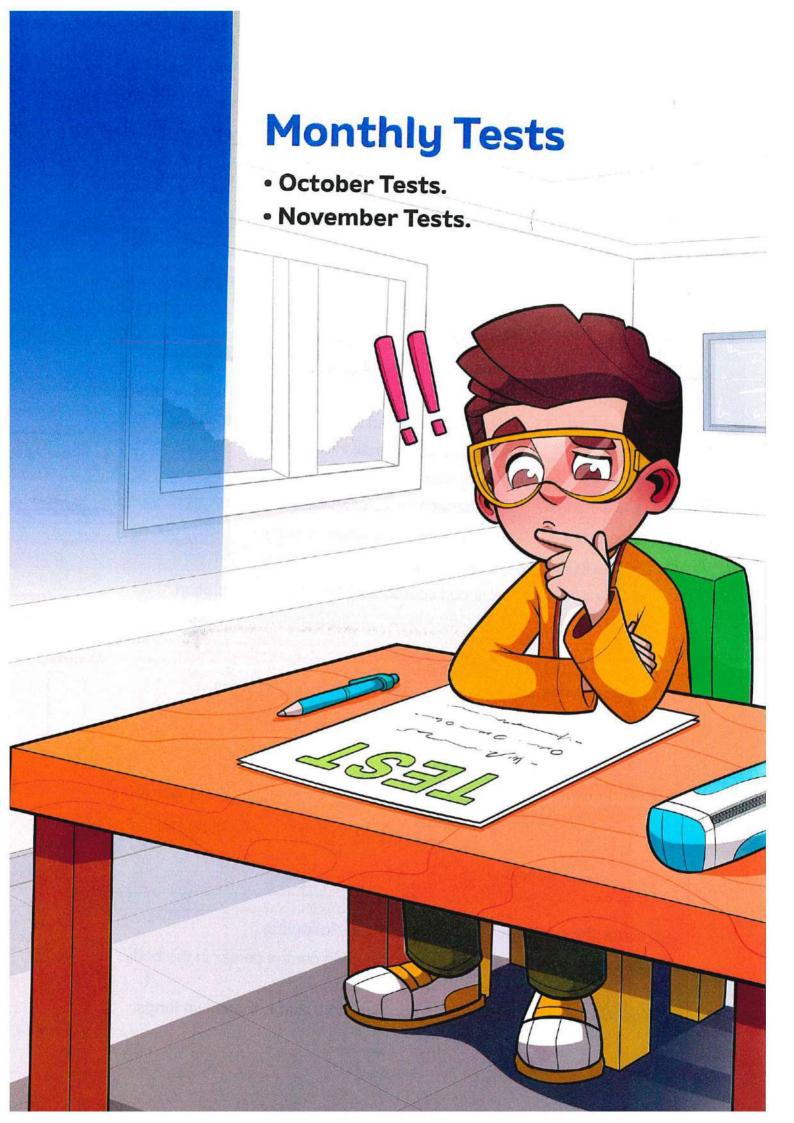
d. backward.

-					
a. re b. inc c. re d. inc	crease the duce the s crease the	peed of a driver' speed of a drive peed of a driver' speed of the dri	s movement forwards movement for some movement back ver's movement back pereases the spee	ward. wards.	force
	ushing	b. gravity	c. friction	d. pulling	
1. In th a. Ar ur b. In m	ne picture re the force hbalanced which dire ove ? (Rig	ection will the chi	balanced or		
dist Whi	ance of 10 ch of the t	0 meters, while wo cars has the		nds, car (A) covered a a distance of 300 meters	•
Whe		pressed spring i ergy occurs fror			



(A)	(B)
1.0 11	a. the energy stored inside the body.
1. Gravity	b. the force that pulls things downward.
2. Friction	c. a force that arises between the surfaces of two
3. Speed	contacted bodies.
	d. energy stored inside dry batteries.
4. Potential energy	e. the distance covered per unit time.

4	2	3	4
	<b>4.</b>	<b>0.</b>	T



## **October Tests**





## Model 1

1 (A)	Choose the cor	rect ans	wer:				(5 mar	ks)
1. F	ish use	. to extra	act oxyger	gas from v	vater.			
а	. lungs	b. gills		c. skin		d. stomach		
2. T	he organ that is	s respor	sible for tl	ne sense of	touch is	S		
	. the ear.			c. the skin		d. the eye.		
3. V	Vhich of the foll	owing c	an turn its	head in all	directio	ns ?		
	. Lizard.	b. Owl.				d. Panther chame	leon.	
4. T	he passage of	food in	your body	from mouth	to bloc	od vessels is		
	. esophagus _							
	. stomach							
	. small intestine				agus.			
d	l. stomach	► small	intestine _	large i	ntestine	•		
(B)	Give a reason	for the f	ollowing					
	Panting of fenr				navioral	adaptation.		
								••••
	1 d (d)						(5 mai	rks)
	Put (V) or (X) Diaphragm has		ortant role	durina diae	stion nr	ocess	(	)
	Jiaphragm nas Jerboa has larg				ation pi	00000.	(	)
	The ears of arc				of fenne	c fox.	ì	)
	Mangrove trees					TO THE CONTRACT OF THE CONTRAC	(	)
					ales in	different seasons	•	
(B)	Compare perm	veen soc			laics iii	In winter		
			in su	mmer		III WIIICO		
	Produced so	und :						
3 (A)	Write the scie	ntific te	rm of eac	n of the fol	lowing		(5 ma	irks)
						center in the body.		140
-0.0	an ann an Aire Aire ann an					(		)
2.	The tube-shape	ed orgar	which co	nnect the th	roat wit	th the two lungs.		
()								

	3. A tree lives in snow habitat which has a triangular shape and ne	
	A A stratagy of hull about which	()
	<ol> <li>A strategy of bull shark which makes its back darker than its bel on prey.</li> </ol>	
	(B) Mention the function of teeth.	()
	(b) Mention the function of teeth.	
	***************************************	
	Total mark	
	Model 2	
1	(A) Complete the following sentences:	
	The diaphragm rises up during the process, while it contains	(5 marks)
	the process.	tracts during
	2. Dolphins have sharp sense of, which they depend on to	o locato livina
	organisms and objects under water through property.	5 locate living
	3. The absorption of nutrients in your body takes place in,	while
	absorption of water from the undigested food takes place in	
	4. Toads breathe under water through their, while they breat using their, while they breat	athe on land by
	(B) What happens if?	
	Your brain receives a message from one of sensory organs thro	uah nerves
	organic and	agii nerves.
	*	
2	(A) Correct the underlined words :	(5 marks)
	1. Kapok tree has taproot which hold the tree firmly in the soggy soi	I.
		()
	2. Reflex is the time taken by the body to respond and react with su	rrounding
	environment.	()
	3. Arctic fox has white fur in summer.	()
P	4. The spinal cord passes through mouth.	()
	(B) Give a reason for the following:	
	A panther chameleon puffs up its body with air.	
		********

3 (A) Give only one example for the following:	(5 marks)
1. Behavioral adaptation of fennec fox.	
2. Structural adaptation of jerboa.	
<ol><li>Desert plant that has sharp spines.</li></ol>	
<ol><li>Nocturnal animal has sharp sight sense.</li></ol>	
(B) Cross out the odd word:	
Acacia tree - Ant - Bat - Kapok tree.	()

#### Total mark

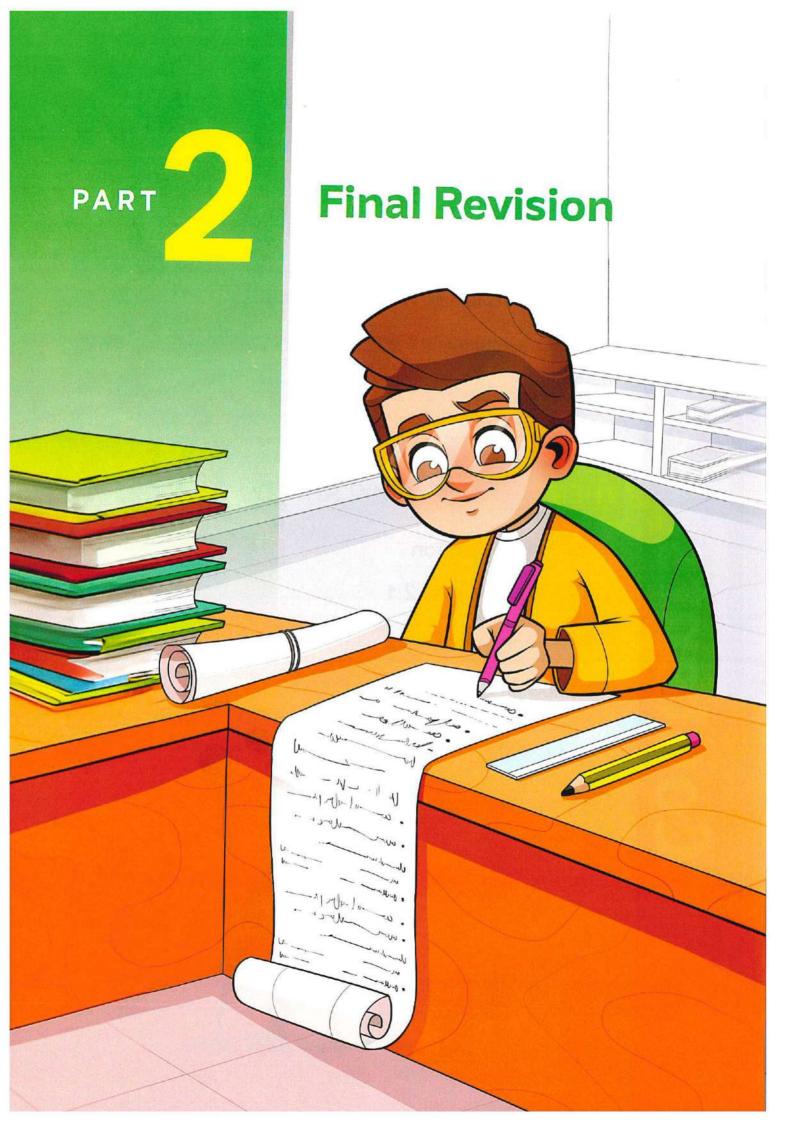
## **November Tests**

15

## Model 1

1	(A) Choose the co	rrect answer:			(5m	arks)
			light to pass through it ?		(3)	ui KS)
	a. Metal.	b. Moon.		enses.		
	2. All the following	signals are inf	formation that the eyes rece	eive, except		
	a. green traffic l		b. fire alarm.			
	c. signal fires.		d. rescue flare.			
	3. When you move	e something av	vay from you, this represent	ts		
	a. pushing force		b. light energy.			
	c. pulling force.		d. sound energy			
	<ol><li>When an object</li></ol>	is in motion, th	nis means that itscl	hanges.		
	a. color	b. shape	c. size d. po	osition		
	(B) Give a reason	for the followi	ng:			
	Wood is consid	lered as an opa	aque material.			
	***************************************				•••••	
2	(A) Put (V) or (X) :				(5 ma	rke)
,	1. The firefly beetle	e is considered	as a type of reptiles.		( ) ( )	)
			ass window as it is an opaqu	ue obiect.	(	)
			until a force acts on it.	<b>,</b>	(	)
	1. When a car cras				ì	)
	B) What happens i					,
	A car runs out	of fuel on a flat	road.			
	***************************************					
					•••••	
_						•••••
3 (	A) Write the scien	tific term of ea	ich of the following:		(5 mai	rks)
1	. It is a visible form	n of energy tha	t travels in the form of wave	s. (		)
			n objects rub against each o			•
	. It is a pattern that			(		.0.50
4	. The force that pull	s objects down	toward the Earth.	(		

(B) Arrange the following statements to show how we can see objects around us:  (
() The electric lamp emits its own light. () The light rays fall on object in the form of waves.  Total mark    1
() The light rays fall on object in the form of waves.    Total mark
1 (A) Complete the following sentences:  1. Glass is considered from
1 (A) Complete the following sentences:  1. Glass is considered from materials, while wood is considered from materials.  2. If you throw a ball through the air, it is affected by the force of your hand and the force of the Earth's gravity.  3. When light rays fall on rough surface, they will at directions.  4. Fireflies communicate with each other by producing a reaction inside their bodies that allow them to up.  (B) What happens to?  Light rays fall on a mirror.  2. (A) Correct the underlined words:  1. The eye pupil in human eyes open wider than that in the nocturnal animals.  2. Moon can emit its own light.  3. The balanced forces cause the object to move.  4. The motion of a car is opposed by the gravity of air.  (B) What happens if?  The Shockwave driver opens the parachutes.
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materials.  2. If you throw a ball through the air, it is affected by the force of your hand and the force of the Earth's gravity.  3. When light rays fall on rough surface, they will at directions.  4. Fireflies communicate with each other by producing a reaction inside their bodies that allow them to up.  (B) What happens to?  Light rays fall on a mirror.  2 (A) Correct the underlined words: (5 marks)  1. The eye pupil in human eyes open wider than that in the nocturnal animals
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3. The balanced forces cause the object to move. (
(B) What happens if?  The Shockwave driver opens the parachutes.
The Shockwave driver opens the parachutes.
<b>3</b> (A) Put (✓) or (X): (5 marks)
Red and green traffic lights are considered as codes.     ( )
2. Friction force always slows down or stops the motion of moving objects. ( )
3. Unbalanced forces cause a change in the object position. ( )
4. A normal truck is faster than the Shockwave truck. ( )
(B) Give a reason for the following:
When you kick a ball laying on the ground, it moves.



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#### **Systems**

#### **UNIT ONE: Living Systems**

Review on Concept 1.1	57 -	- 67
Review on Concept 1.2	68	- 73
Review on Concept 1.3	 74	- 77

## THEME 2 Matter and Energy

#### **UNIT TWO: Motion**

Review on Concept 2.1	78 - 81
Review on Concept 2.2	82 - 85
Review on Concept 2.3	 86 - 89





# Review on Concept (1.1)

# 1 Scientific terms (Definitions):

Scientific terms	Definitions	
1. Adaptations :	They are characteristics that help living organisms to survive and reproduce in the ecosystem in which they live.	
2. Ecosystem :	It is an area in which living organisms and nonliving things interact with each other.	
3. Camouflage :	It is a way of adaptation that some animals use to hide from their predators or their preys by blending in with the surrounding environments.	
4. Structural adaptation :	It is a change in the body structure of a living organism to hel it survive.	
5. Behavioral adaptation :	It is a change in the behaviors or acts of a living organism to help it survive.	
6. System :	It is a group of organs that work together to perform a specific job	
7. Digestion process :	It is a process of breaking down food into smaller parts that the body can use them to get energy and grow.	
8. Respiration process :	It is a process of pulling air in (inhalation) and pushing air out (exhalation) of the body.	

# 2 Importance or uses:

Items	Importance or uses	
1.Teeth:	They crush (grind) food during chewing.	
2.Saliva :	It moistens food and begins to break it down.	
3.Tongue:	It mixes food with saliva in the mouth.	
4.Esophagus :	It allows the food to move from throat down into the stomach.	
5.Stomach :	It mixes food with the stomach acid and digestive juices (enzymes) found in it to change the food into a soupy liquid.	
6.The small intestine :	<ul> <li>Breaking down of food into nutrients by the help of the juices of liver and pancreas.</li> <li>Absorbing nutrients through tiny blood vessels to all body parts</li> </ul>	
7.The large intestine :	Absorbing the water from undigested materials.	
8.Throat :	<ul> <li>It allows the food to pass from the mouth to the esophagus.</li> <li>It allows the air to pass from the nose to the trachea.</li> </ul>	
9.Trachea :	It allows the air to pass from the throat to the two lungs.	
10.Two bronchi :	They allow the air to pass from the trachea to the two lungs.	

#### 3 Give reasons for :

1. The starred agama lizard always looking for shade areas in desert.

To keep its body cool during hot sunny days.

2. The penguin's body has a thick layer of fat and dense feathers.

To keep its body warm.

3. The blood vessels in the penguin's feet weave around each other.

To keep its toes from freezing as the warm blood vessels heat up the cold blood vessels.

4. Some desert lizards have colorful scales.

To hide among the colorful rocks in the desert.

5. Fennec fox has sandy-colored fur, while polar bear has a white fur.

Fennec fox has a sandy-colored fur to blend in with desert landscapes, while polar bear has a white fur to blend in with snow in polar region.

6. Some animals have the ability to make camouflage adaptation.

Because camouflage helps some animals hide from their predators or preys in different environments.

7. Fennec fox has a tan-colored coat.

To hide in a sandy, rocky environment and to protect it from the hot Sun.

8. Fennec fox pants like a dog.

To cool its body.

9. Arctic fox has a thick fur coat.

To keep its body warm in extreme cold climate.

10. The fur of arctic fox is white during winter but it turns brown in summer.

To help it sneak up on prey in any season.

11. Burrows are excellent places for arctic and fennec foxes.

Because burrows help:

- Fennec fox to stay cool during the sunny day.
- Arctic fox to stay warm at night.

12. Fennec fox has extra-large ears, while arctic fox has short ears.

Because extra-large ears help the fennec fox to lose the heat to cool its body, while short ears help the arctic fox to stay warm.

# 13. Bull sharks have less competition for finding food in fresh water.

Because other types of sharks live in salt water only.

## 14. Panther chameleon has V-shaped feet and a long tail.

To hold tightly the branches of trees.

# 15. Changing the color fur of arctic fox is considered as structural adaptation.

Because it is a change in the body structure of living organism to help it survive.

#### 16. Acacia tree has very long trunk.

To prevent animals from reaching its leaves to feed on.

## 17. Acacia tree has sharp spines around its leaves.

To prevent animals from eating its leaves.

#### 18. Wind is important to acacia tree.

Because acacia tree uses wind to send smelly message to acacia trees nearby telling them to start making a poison.

#### 19. Kapok tree has hand-shaped leaves.

To allow wind to move more gently through the leaves without cutting them.

# 20. Kapok trees stay firmly rooted in the soggy soil although they are very tall.

Due to presence of large, wide buttress roots.

#### 21. Pine tree has a triangular shape and short branches.

To allow the snow slide easily over it, so its branches don't break.

## 22. Water lilies have wide floating leaves.

To absorb a large amount of sunlight.

## 23. Mangrove tree has long and strong roots.

To resist the water waves.

#### 24. Palm trees have thick trunk and small leaves.

To resist the strong winds.

#### 25. Barbary fig has sharp spines.

To prevent animals from eating its fruits and leaves.

## 26. The human body is made up of different systems.

To perform different functions.

#### 27. The importance of juices of liver and pancreas.

Because they help in breaking down food into nutrients.

## 28. Anus is an important organ in the digestive system.

Because solid waste materials leave the body through it.

29. The inhaled air differs from the exhaled air.

Because the inhaled air is rich in oxygen gas, while the exhaled air is rich in carbon dioxide gas.

30. Diaphragm plays an important role in respiration process.

Because it contracts and moves downward during inhalation to increase the size of chest, while it relaxes and moves upward during exhalation to decrease the size of chest.

31. Gills are very important organ for fish.

Because they enable fish to extract oxygen gas from water for respiration.

32. Cars and factories exhausts cause breathing problems.

Because they produce smog which causes damage of lungs, asthma and heart diseases.

33. Sometimes people in big cities must change their lifestyle.

To decrease air pollution.

34. Skin of fish is different from that of frog, although both of them live in water.

Because skin of frog can absorb oxygen gas directly from water, while fish cannot.

35. Dry seasons is very harmful for amphibians.

Because their skin must be wet all the time, to be able to get oxygen gas directly from water.

36. Pollution of air and water can affect the survival of amphibians.

Because they breathe in oxygen gas from water and air.

37. Scientists must study how amphibians interact with their environments.

To help them survive.

#### 4 What happens ...?

1. If the warm blood vessels and cold blood vessels in the penguin's feet do not weave around each other.

The blood moving up into the penguin's body will be cold which may make it freeze.

2. If the polar bear has thin fur instead of its thick fur.

It cannot adapt with the very cold weather in polar regions.

3. If the body of fennec fox is covered with black fur.

It cannot hide and hunt its preys in the desert environment.

4. If some types of lizards are not able to make camouflage adaptation.

They cannot hide from their predators or preys in their environments.

5. If arctic fox has a brown coat during winter but it turns white during summer.

It cannot hide from its prey in winter or summer.

6. If fennec fox has short ears.

It cannot cool its body.

7. If the sense of hearing becomes weak in foxes.

They cannot hunt easily.

8. If arctic fox has only a white coat during all seasons of the year.

It cannot sneak up on prey in summer season.

9. If both eyes of panther chameleon move in one direction only.

The panther chameleon cannot hunt its prey and avoid becoming a prey at the same time.

10. If panther chameleon is exposed to danger.

It puffs up its body with air, opens its mouth wide and changes the color of its scales.

11. If the length of acacia taproot doesn't exceed 3 meters downward.

It can't search for water in the deep soil.

12. If the acacia leaves are not guarded by sharp spines.

Animals can eat these leaves easily.

13. If there are no buttress roots in the kapok tree.

Kapok tree can't stay firmly in soggy soil.

14. If the pine tree has an umbrella shape not a triangle shape.

The snow can't slide easily over its branches and the branches break down more easily.

15. If some plants of rainforest habitat became very short.

The sunlight can't reach these plants easily.

16. If water lily has narrow leaves instead of wide leaves.

It can't absorb a large amount of sunlight.

17. If palm tree has thin trunk and large leaves.

It can't resist the strong winds.

#### 18. If the small intestine is removed from the human body.

The digestive system could not do its function correctly.

# 19. If the nutrients absorbed by the walls of small intestine enter the tiny blood vessels.

The blood carries these nutrients to all the body parts.

# 20. If the diaphragm moves downward during inhalation.

The size of chest increases, the air rich in oxygen gas enters the lungs.

## 21. If the diaphragm moves upward during exhalation.

The size of chest decreases, the air rich in carbon dioxide gas comes out of the lungs.

#### 22. If human activities and bad habits increase.

The pollution of air, water and soil will increase.

## 23. If the exhausts from cars and factories increase in big cities.

Smog increases causing breathing problems as damage of lungs, asthma and heart diseases.

## 24. If water pollution increases (for humans and fish).

Humans cannot get clean water to drink and fish cannot get clean water to breathe.

# 25. If pollution level increases in the natural habitat of amphibians.

The number of amphibians will decrease.

# 26. If the ecosystem of amphibians is containing clean air and water.

Amphibians will survive and their numbers increase.

# 27. If amphibians don't have lungs and breathe only through skin.

They can live only under water.

## 28. If the number of predators of amphibians increases.

The number of amphibians will decrease.

### 29. If salamanders have lungs only to respire.

Salamanders can live on land only.

#### 30. If skin of frogs becomes dry.

They will breathe by using lungs only and can't breathe through their skin, so they can't live under water.

## 5 Comparisons:

# 1. Penguin, polar bear, brown (black) bear, fennec fox and desert lizards:

Points of comparison	Penguin	Polar bear	Brown (black) bear	Fennec fox and Caracal	Desert lizards
1. Habitat :	Antarctica region	Arctic region	Forests	Desert	Desert
2. Body is covered with :	Dense feathers	White thick fur	Dark fur	Sandy-colored fur	Colorful scales

## 2. Fennec fox and arctic fox:

Points of comparison	Fennec fox	Arctic fox
1. Habitat :	Hot desert	Tundra desert
2. Color of fur :	Tan-colored	White in winter, brown in summer
3. Shape of ears :	Extra-large ears	short ears
4. Time of entrance to burrows :	During sunny days	At night

# 3. Structural adaptation and behavioral adaptation :

Points of comparison	Structural adaptation	Behavioral adaptation
1. Definition :	It is a change in the <b>body</b> structure of a living organism to help it survive.	It is a change in the <b>behaviors</b> or <b>acts</b> of a living organism to help it survive.
2. Examples :	The blood vessels in the penguin's feet.	Desert lizard looks for shade area during hot sunny days.
	The thick fur of the polar bear.	Migration of some animals towards certain regions.

# 4. Acacia tree and kapok tree :

Points of comparison	Acacia tree	Kapok tree	
1. Habitat :	Savannah	Amazon rainforest	
2. Leaves :	Tiny leaves have sharp spines	Hand-shaped leaves with narrow parts	
3. Roots :	Very long (taproot)	Large wide (buttress roots)	
It produces a poison.     It sends smelly messa in the wind to other acacia trees.		It has delicious-smelling flowers to send messages to attract bats.	

# 5. Mangrove tree, water lily, pine tree, palm tree and barbary fig:

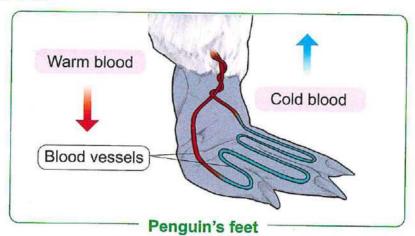
Points of comparison	Mangrove tree	Water lily	Pine tree	Palm tree	Barbary fig
1. Habitat :	Salt water	Fresh water (wetland)	Snow	Desert	Desert
2. Structural adaptation :	Long strong roots	Wide floating leaves	Triangular shape, short branches and needle leaves	Thick trunk and small leaves	Sharp spines and tough cover

#### 6. Inhalation and exhalation:

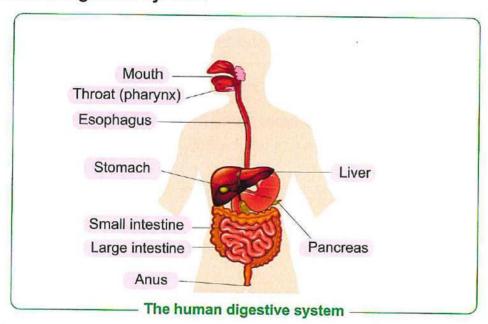
Points of comparison	Inhalation	Exhalation
1. Diaphragm :	Contracts and moves downwards	Relaxes and moves upwards
2. The size of chest :	Increases	Decreases
3. The air is rich in :	Oxygen gas	Carbon dioxide gas

## 6 Important drawings:

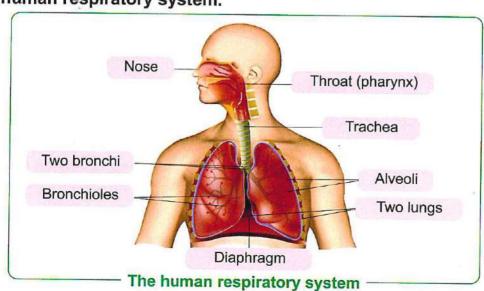
#### 1. Penguin's feet.



# 2. The human digestive system.



#### 3. The human respiratory system.



### 7 Main points:

- Living organisms have different ways (adaptations) to protect themselves from different climates.
- Examples of some animals that make adaptation to survive in their environment through camouflage :
  - 1. Polar bear.
  - 2. Brown bear and black bear.
  - 3. Caracal and fennec fox.
  - 4. Some desert lizards.
- Predator: is an animal that hunts and eats another animal.
- Prey: is an animal that is hunted and eaten by another animal.

## Some animals and their structural and behavioral adaptations :

Animals	Structural adaptation	Behavioral adaptation
Fennec fox : (lives in hot dry desert).	It has a tan-colored coat.     It has extra-large ears.	<ul><li>It pants like dogs.</li><li>It lives in burrows.</li><li>It eats all kinds of food.</li></ul>
Arctic fox : (lives in tundra desert).	<ul> <li>It has a thick fur coat.</li> <li>Its fur coat is white during winter but turns brown in summer.</li> <li>It has short ears and legs.</li> </ul>	<ul><li>It lives in burrows</li><li>It eats all kinds of food.</li></ul>
Bull shark: (lives in fresh water and salt water).	<ul> <li>It uses countershading feature, in which the upper surface of its body is darker than its lower surface.</li> <li>It has sharp teeth.</li> </ul>	<ul><li>It eats different types of food.</li><li>It hunts during the day and at night.</li></ul>
Panther chameleon : (lives in tropical rainforest).	<ul> <li>Its eyes can face opposite directions and move independently.</li> <li>It has brightly colored scales.</li> <li>It has V-shaped feet and tail like a hand.</li> </ul>	<ul> <li>It puffs up its body with air.</li> <li>It opens its mouth wide.</li> <li>It changes the colors of its scales.</li> </ul>

- A body consists of group of systems; each system consists of group of organs that work together to perform a specific job.
- The digestive system breaks down food into smaller parts that your body can use.
- · Digestive system of human consists of :
  - 1. Mouth.

- 2.Throat (pharynx).
- 3. Esophagus.

- 4. Stomach.
- 5. Small intestine.
- 6. Large intestine.
- Respiratory system is the system responsible for breathing.
- Respiratory system of human consists of:
- 1. Nose.

- 2. Throat (pharynx).
- 3. Trachea.

- 4. Two bronchi.
- 5. Two lungs.

6. Diaphragm.

- Respiration process includes :
  - 1. Inhalation.
- 2. Exhalation.
- Living organisms breathe in oxygen gas and breathe out carbon dioxide gas.
- Humans have lungs to inhale oxygen gas from air to adapt to live on land.
- Fish have gills to inhale oxygen gas from water to adapt to live under water.
- Amphibians respire through lungs and skin to adapt to live on land and in water.
- We have to keep air, water and soil clear, in order to protect living organisms from extinction.

# **Review** on Concept (1.2)



# 1 Scientific terms (Definitions):

Scientific terms	Definitions	
1. Echo :	The bouncing back of sound waves when they hit a solid surface.	
2. Echolocation :	The property that some animals depend on to determine the location of other living organisms or objects through the sound reflected from them.	
3. Nocturnal animals :	They are animals that become more active at night to look for their food.	
4. Sensory receptors :	They are nerves found in sensory organs that are responsible for receiving information from the environment	
5. Reaction time :	It is the time taken by the body of a living organism to respond and react to different information from the environment (such as danger).	
6. Reflexes :	They are messages sent by the nervous system that are often so fast that you cannot realize them.	

# 2 Importance or uses:

Items	Importance or uses	
1. Echolocation :	Used to determine the location of other living organisms.	
2. The nervous system :	<ol> <li>It gathers information through the sensory organs.</li> <li>It makes sense of (translates) these information through the brain.</li> <li>It tells the body what to do according to these information.</li> </ol>	
3. The brain :	The main control center in the body.	
4. The spinal cord :	It carries messages from the brain to the body parts and vice versa.	
5. Nerves :	They carry messages from the brain to the spinal cord and other parts of the body and vice versa.	
6. Special cane of blind person :	The state of the s	

#### 3 Give reasons for:

#### The Egyptian mongooses make sounds.

To communicate with other mongooses to move from one place to another or when searching for food.

#### 2. Owls can hunt during the night.

Because they have extraordinary senses of hearing and sight that make them able to find their preys in the dark.

#### 3. Dogs are used in guarding.

Because they have very sharp senses of hearing and smell.

#### 4. Dolphins can hear all kinds of sound.

Because they have sharp senses of hearing, so they can hear all kinds of sound.

## 5. Animals that live in hot regions become active at night.

Because the weather becomes cool at night in these regions.

#### Owls have bowl-shaped faces.

To direct distant sounds into the owl's ears.

#### 7. Bats can catch insects in the dark.

Because they depend on echolocation to find insects at night.

#### 8. Owl is a nocturnal animal.

Because it becomes active at night.

## 9. The Egyptian jerboa can jump for long distances.

Because it has long hind legs that make it jump for long distances.

## 10. The presence of hair on the Egyptian jerboa's feet and toes.

To help it grip the sand when it jumps.

# 11. The Egyptian jerboa's ears play a very important role in its survival.

Because it has large and sensitive ears, so it can detect even a quiet snake.

## 12. Humans can recognize the sound of different musical instruments.

Because ears receive the different sounds and send them through nerves to the brain to be processed, so brain can determine the type of musical instrument.

### 13. The brain has an important function in the nervous system.

Because it is the main control center of the body.

## 14. The nurse ants send smelly messages to scout ants.

To alert the scout ants that the food is low.

15. The soldier ants use smells in their communication.

To communicate with the other ants in case of danger.

- 16. The songs of humpback whales have high-pitched sounds during winter months.

  Because high-pitched sounds travel better through cold water.
- 17. Humpback whales sing different songs.
  To communicate with each other in different seasons.
- 18. The echo that is picked up by the special cane of blind people is turned into vibrations.

To tell the blind person where objects are around him.

19. The blind people cannot hear the sound that emits from their special canes. Because their special canes emit a high-pitched sound that human's ears cannot hear it.

#### 4 What happens ...?

- To the sound waves produced by a dolphin when they hit an object under water.
   The sound waves bounce back to the dolphin in the form of echo so, the dolphin can detect the location of this object.
- If bats lose the ability to hear by using echolocation property.They cannot hunt at night.
- If owls cannot turn their heads in all directions.They cannot search for preys everywhere, but in one direction only.
- 4. If your hand touches the spines of a barbary fig plant.
  The hand will move quickly away in less than one second.
- If the Egyptian jerboa hears a snake moves towards it.It hops in zigzag patterns, so it can escape quickly from danger.
- If the spinal cord became absent from the components of the nervous system.Messages cannot be transmitted between brain and body parts.
- 7. If sensory receptors related to the eyes stopped sending messages to the brain.
  Brain cannot process what is seen by the eyes.
- If the smell sense of ants becomes weak.They cannot communicate with each other by smelly messages.
- If the amount of food in the ants colony decreases.The nurse ants send smelly messages to scout ants to alert them to find the food.

10. If there is a danger near to an ants colony.

The soldier ants send smelly messages to alert the other ants that there is a danger nearby.

- 11. If high-pitched sound that is produced by the blind person's cane hits an object. It bounces back to the cane in the form of echo which is turned into vibrations.
- 12. If bats cannot use echolocation property.

They cannot locate the objects by the sense of hearing or hunt its preys at night.

13. If the hearing sense of humpback whales becomes weak.

They cannot communicate with each other by songs using their hearing sense.

14. If there is a wall in front of a blind person uses his special cane.

The cane will make vibrations that tell the blind person that there is a wall in front of him.

#### 5 Comparisons:

1. The songs of humpback whales in different seasons :

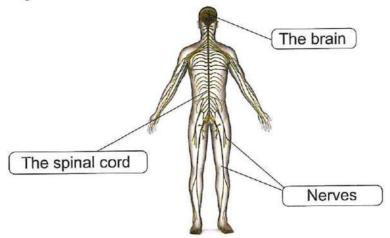
In winter	In Summer
<ul> <li>It is the mating season.</li> <li>Their songs have high-pitched sounds which travel better through cold water.</li> </ul>	<ul> <li>It is the feeding season.</li> <li>Their songs have low-pitched sounds which travel better through warm water.</li> </ul>

# 2. The similarities and differences between the special cane of blind person and bat echolocation :

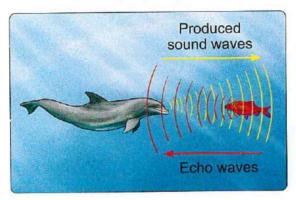
Special cane of blind person	Bat
Simil	arities j
<ul> <li>The special cane of blind person and b bounces off objects as an echo.</li> </ul>	ats emit a <b>high-pitched sound</b> that
<ul> <li>This special cane and bats receive the objects are.</li> </ul>	echo that can tell how far away
Diffe	rences j
- This special cane picks up an echo from the sound it emits and changes	- Bats pick up an echo from the sound they emit but they don't

#### 6 Important drawings:

## 1. The nervous system of mammals consists of :



#### 2. Dolphin uses the echolocation property:



#### 7 Main points:

- Some animals have sharp senses to help them adapt to their habitats and survive.
- The sharpest sense in dolphins is hearing, so that a dolphin can locate its preys by using echolocation (echo).
- Some animals can look for their food at night using their super senses, these animals that become active at night are known as "Nocturnal animals".

## - Super sensory adaptations of nocturnal animals :

- Bats: Rely on echolocation to find their food and move around.
- Owls: Have both extraordinary sight and hearing senses.
  - Bowl-shaped faces and specialized head feathers help them to direct distant sounds into the owls' ears.
  - Owls' large eyes allow them to detect tiny and faraway movements of their preys.
  - Owls have the ability to turn their heads in all directions to search for preys everywhere.

#### - The nervous system consists of :

- The brain: It is connected to the spinal cord.
- The spinal cord: It consists of many nerves that are collected together and run through the backbone.
- Nerves: They are distributed throughout the body and connect the sense organs and the body parts with the brain.
- The nerves transmit information from the sensory organs to the brain.
- The five sensory organs contain a special type of nerves known as sensory receptors.

## - The Egyptian jerboa is a desert rodent that has :

- large and sensitive ears.
- · long hind legs.
- · hair on its feet and toes.
- Some messages called "reflexes", are so fast that you cannot realize it such as moving your hand away when touching a very hot cup of tea.
- Other messages are sent from and to the brain automatically, like the signal to breathe.
- Humans and animals use variety of ways to communicate with each other as sound, light and movement.

# Ants communicate with each other through their sense of smells such as :

- 1. Nurse ants send smelly messages to scout ants when the food is low.
- 2. Scout ants respond by sending a smelly message to alert the ants where to find the food.
- 3. Soldier ants use smelly messages to communicate if there is danger nearby.
- Scientists created a special cane that emits a high-pitched sound just like bats do to help blind people detect their surroundings.

# **Review** on Concept (1.3)

#### 1 Scientific terms (Definitions):

Scientific terms	Definitions	
1. A source of light :	It is something that emits its own light.	
2. Light :	It is a visible form of energy that travels in the form of waves.	
3. Opaque objects :	They are objects that don't allow light to pass through.	
4. Transparent objects :	They are objects that allow light to pass through.	
5. Code:	It is a pattern that has meaning.	

#### 2 Importance or uses:

Items	Importance or uses
1. Night vision goggles :	It is used by human to see in the dark.
2. Mirror-like It reflects light allowing the fishing cat's eyes membrane: more light.	
3. Lighthouse :	It sends codes in the form of flashes of light tell sailors where they are.

# 3 Give reasons for:

1. The fishing cat's eyes seem to glow in the dark.

Because it has a mirror-like membrane at the back of its eyes which bounces off the light.

2. Candle is considered as a source of light.

Because it gives off its own light.

3. The eye pupil of nocturnal animals differs from that of the human.

Because the eye pupil of nocturnal animals open wider than the eye pupil of human.

4. In the presence of light, we can see objects around us.

Because the light rays fall on objects then reflect off these objects into our eyes, causing vision.

5. The moon appears bright although it is not source of light.

Because the moon reflects the sunlight.

- Shadow of an opaque body is formed when light falls on it. Because the opaque body doesn't allow light to pass through.
- 7. You can see an object placed behind a glass cup.
  Because the glass cup is a transparent material which allows light to pass through.
- 8. A mirror can reflect light better than a painted surface.

  Because the mirror is more smooth than the painted surface.
- Humans receive and send information through speaking, writing and reading.

To communicate with each other.

10. Firefly beetles use different patterns of flash lights to communicate with each other.

To warn off from predators or to attract a mate.

- 11. Firefly beetles produce a chemical reaction inside their bodies. To light up their bodies and communicate with each other.
- 12. The symbols that are used in writing have a specific pattern.
  To give a specific meaning according to the arrangement of letters in a word.
- 13. People use face expressions during talking with each other. To help people predict our feeling.

## 4 What happens if ...?

- The mirror-like membrane in the fishing cat's eyes is not present.
   It doesn't have excellent night vision so cannot hunt at night.
- The moon can't reflect the sunlight. It seems to be dark and we can't see it.
- 3. You place a wood sheet between a light source and a wall.
  The shadow of the wood sheet is formed on the wall, because light rays cannot pass through it.
- Light falls on a transparent body such as a glass window.
   Light passes through the glass window.
- Light falls on a rough surface.Light rays are reflected in different directions.
- 6. A firefly beetle wants to attract a mate to reproduce.
  It produces a chemical reaction inside its body to light up and attract a mate.
- 7. The traffic light becomes red while you are going to cross the road.

  The eyes send a message through nerves to my brain to stop walking and not cross the road.

# 5 Comparisons:

# 1. Eyes of humans and eyes of nocturnal animals :

Points of comparison	Eyes of humans	Eyes of nocturnal animals
Size of the eye :	Small eye	Big eye
• Eye pupil :	Opens narrower	Opens wider (to allow more light enter their eyes).

# 2. Opaque objects and transparent objects :

Opaque objects	Transparent objects
- They are objects that don't allow light to pass through.  Opaque object	- They are objects that allow light to pass through.
- Things can't be seen through them.	- Things can be seen through them.
Examples: rocks, wood, metals and the human body.	Examples : air, water, glass windows and lenses.

# 3. Smooth surface and rough surface :

Smooth Surface	Rough Surface
- If the surface is <b>smooth</b> (such as a mirror), the light rays will reflect in one direction with the same angle at which they strike (hit) the object originally.  Incoming light rays  Smooth surface	- If the surface is <b>rough</b> (such as a painted surface), the reflected light rays will scatter or diffuse in different directions.  Incoming light rays  Rough surface

#### 6 Main points:

- Humans need more light to see clearly in the low-light places, and without it they
  will need a device known as "night vision goggels" to see in the dark.
- Nocturnal animals as fishing cats are better to see in the dark than humans, because they have :
  - 1. Big eyes.
- 2. Wide eye pupils.
- 3. Mirror-like membrane.
- The mirror-like membrane at the back of fishing cat's eyes is a structural adaptation which bounces off any little amount of light that falling on it.
- Light travels in straight lines.
- Opaque objects (including the human body) always form shadows because all
  the light rays either bounces off or is absorbed, so no light rays pass through the
  opaque objects.
- Shiny and smooth materials (such as : mirror and metal) reflect light better than rough materials (such as : plastic, wood, cloth and paper).
- How does light striking matter make it possible for humans and animals to see?

When light rays strike an object, light reflects (bounces) off this object.

The reflected light travels in a straight line into the eyes.

Special nerves in the eyes send messages to the brain.

The brain interprets the messages as an image of this object.

- Humans and animals use different ways to communicate with each other as sound and light.
- Firefly beetles produce different flash patterns to warn off from predators or to attract a mate to reproduce.
- Humans can communicate using language and can use codes to transfer information.

# **Review** on Concept (2.1)

### 1 Scientific terms (Definitions):

Scientific terms	Definitions	
1. Motion :	It is any change in the position of an object relative to a fixed starting point.	
2. Gravity :	It is the force that pulls objects down toward the Earth.	
3. Force :	It is a push or pull that is applied to an object causes it to change its position.	
4. Friction : It is a force that is exerted when objects rub again		

# 2 Importance or uses:

Items Importance or uses		
1. Three jet engines in the Shockwave truck :	They make the Shockwave truck reach speeds more than 500 kilometers per hour.	
2. Three parachutes in the Shockwave truck :	They help slow down the Shockwave quickly.	
3. Fire extinguishers onto a cart :	They make the cart begins to move forward when they release air which moves backward.	
4. Friction :	It always slows down or stops motion of moving objects.	
5. Force :	It transfers energy from one object to another.	

## 3 Give reasons for :

- 1. The Shockwave truck is faster than the normal truck.
  - Because the Shockwave truck has three jet engines.
- 2. Engineers use parachutes in the Shockwave truck designs.
  - To help slow down the Shockwave truck quickly.
- 3. When you kick a ball laying on the ground, it moves.
  - Due to the pushing force of your leg that acts on it.

4. By increasing the number of fire extinguishers, the distance that the cart moves will increase.

Because by increasing the number of fire extinguishers, the speed of the cart will increase.

When two equal pushing forces act on an object in opposite directions, the object doesn't move.

Because the two forces are balanced, so the object doesn't move.

6. If you let a pen out of your hand, it falls to the ground.

Due to the pulling force of the gravity that pulls the pens down toward the Earth.

7. When your friend catches a ball that is thrown in the air, the motion of the ball is stopped.

Due to the pushing force of his hand against the ball movement that makes it stops.

8. Parachutes are used in the Shockwave truck and rocket.

To help slow down their movement.

9. When your toy car crashes into a wall, it will stop moving.

Because the wall applies a force to the car with the same amount of the force that pushes the car toward the wall.

When you stop pedalling during the movement of your bicycle, it slows down until it stops.

Due to the friction force between the bicycle tires and the road that acts in the opposite direction of the bicycle movement.

11. If you push two similar toy cars on the same ground, one of them may travel for a longer distance than the other.

Due to the difference in the forces that act on each of them.

12. If the same force acts on a small car and a truck, the small car will travel for a longer distance than the truck.

Because the small object travels faster than the bigger object when the same amount of force acts on them.

 Any body moves on the ground is usually affected by a force opposes its direction of movement.

Because there is a friction force between the moving body and the ground that acts in the opposite direction of the body movement.

#### 4 What happens if ...?

1. You kick a stopped ball on the ground.

It starts to move on the ground.

2. Engineers placed jet engines inside a normal truck instead of its normal engine.

It turns into the Shockwave truck and moves with high speed.

3. The Shockwave driver opens the parachutes.

The Shockwave truck starts to stop gradually.

The pulling force of one of the two teams in tug-of-war game becomes greater than the other team.

The team with greater force will win the game, because the rope will move toward the team of greater pulling force.

5. The pulling forces of the two teams are equal in the tug-of-war game.

The rope will not move because the two forces are balanced.

6. You let your toy out of your hand.

It will fall down on the ground due to the pulling force of gravity.

7. A car runs out of fuel on a flat road.

Its speed decreases gradually until it stops.

8. You push two similar balls with different forces on the ground.

The ball that is affected by the greater force will move a longer distance than the other ball.

9. A car and a truck are affected by the same pushing force.

The car travels a distance longer than the truck.

#### 5 Comparison:

Pushing force	Pulling force
The force you can do to move an object away from you.	The force you can do to bring an object closer to you.
Example : A man pushes a wheelbarrow.	Example : A child pulls a toy car.

#### 6 Main points:

- The Shockwave truck contains three jet engines.
- The Shockwave truck is faster than the normal trucks.
- The Shockwave truck has three parachutes to help slow down it quickly.
- Air can move objects such as leaves on a tree that move by the wind blowing.
- When fire extinguishers fixed onto a cart release air, the air moves backward that makes the cart moves forward.
- By increasing the number of fire extinguishers, the speed of the cart increases and the distance that it moves increases too and vice versa.
- There are two forces that cause objects to move which are :
  - 1. Pushing force.

- 2. Pulling force.
- If balanced forces act on an object, it will not move.
- If unbalanced forces act on an object, it will move toward the greater force.
- An object is in motion if its position changes from one place to another, even if this change can't be seen.
- Some motion is easy to be seen such as a person walks down the street.
- Some motion is hard to be seen such as the rotation of the Earth around the Sun.
- Moving object only stops when a force of the same amount is applied to it in the opposite direction of its motion.
- Friction force always slows down or stops motion of moving objects.
- The direction of friction force is always opposite to the direction of motion of a moving object.
- Hard push causes object to travel a long distance.
- Gentle push causes object to travel a small distance.
- If the same force acts on a toy car and a toy truck :
- The car (the smaller object) will travel a farther distance.
- The truck (the bigger object) will travel a shorter distance.
- Force transfers energy from one object to another.
- The work done is equal to the amount of energy transferred by a force that is used to move an object.



# Review on Concept (2.2)

## 1 Scientific terms (Definitions):

Definitions
It is the ability to do work or cause change.
It is a force that causes an object to move a distance
It is the amount of energy that is stored in an object due to its position.
It is the energy of an object due to its motion.

### 2 Give reasons for :

The roller coaster doesn't need electricity during its movement down the hill.

Because its stored potential energy changes into kinetic energy, that helps it move downward.

- The speed of the roller coaster increases as it moves down the hill. Because its kinetic energy increases.
- The goal net vibrates when a ball hits it.Because the kinetic energy of the ball transfers to the goal net.
- 4. A bird stops on a tree has energy. Because the bird is found at a height from the Earth's surface, so it has potential energy.
- When a stone is thrown upwards, its potential energy increases.Because its height from the Earth's surface increases.
- Electric lamp produces different forms of energy.
   Because it produces light and thermal energies.
- 7. On winding up the spring of a toy car, then let it free, the car moves.
  Because the potential energy which is stored in the spring changes into kinetic energy.
- 8. A sand surfer moves very fast down the sand slope. (according to the change of energy).

Because his stored potential energy changes into kinetic energy.

When a tennis ball is thrown upwards, its potential energy increases.
 Because its height from the Earth's surface will increase.

10. The stored potential energy in a battery differs from that of a ball at the top of a hill.

Because the battery stores chemical potential energy, while a ball at the top of hill stores gravitational potential energy.

11. We can't live without eating food.

Because burning of food produces kinetic energy to carry out different activities.

#### 3 What happens ...?

To the energy of the roller coaster when it moves down the hill.
 Its stored potential energy changes into kinetic energy.

2. To the roller coaster when it loses its kinetic energy. It cannot move, so it will stop.

- To the energy of a stopped ball at the top of a ramp starts to move down. Its stored potential energy changes into kinetic energy.
- To the potential energy of an object when it is placed at a height from the Earth's surface.

The object has potential energy.

5. To the energy of an apple falls from a tree to the ground.

The potential energy of the apple changes into kinetic energy.

To the potential energy of a book you transfer from the ground to a higher shelf.

The potential energy of the book will increase.

- If you operate a washing machine. (according to the change of energy).
   The electrical energy changes into kinetic and sound energies.
- If a boy moves down the slide. (according to the change of energy).
   The potential energy changes into kinetic energy.
- If you switch on an electric lamp. (according to the change of energy).
   The electrical energy changes into light and thermal energies.
- 10. If food burns inside the human body.

The stored chemical energy of food changes into kinetic energy so human can carry out different activities.

11. If you put a battery inside a flashlight, then you switch.

(according to the change of energy).

The stored chemical energy in the battery changes into light and thermal energies.

#### 4 Comparison:

Points of comparison	Potential energy	Kinetic energy
Definition :	It is the amount of energy that is stored in an object due to its position.	It is the energy of an object due to its motion.
Forms :	- Gravitational potential energy.  - Chemical potential energy.	<ul><li>Sound energy.</li><li>Light energy.</li><li>Electrical energy</li><li>Thermal energy.</li></ul>
Example :	The ball has potential energy stored in it when you lift it up away from the Earth's surface.	The ball has a kinetic energy when you let it fall down to the ground.

### 5 Main points:

- The roller coaster has the most potential energy when it reaches the highest point of the hill. This energy changes into kinetic energy when the roller coaster moves down the hill.
- Energy is very important in our life and it is found everywhere around us.
- Energy can be stored and changed from one form into another.
- We cannot see most forms of energy but we can see and measure what energy can do.
- Scientists classify energy into two types which are potential energy and kinetic energy.
- When an object has potential energy, so this object is ready to do work or to be active.

# - Factors affecting potential energy of an object are :

- Mass where by increasing the mass of an object, the potential energy increases.
- Height where by increasing the height of an object from Earth's surface, the potential energy increases.

#### Energy can be

#### **Transferred**

- Energy is transferred from one place to another.
- · Example :

When you kick a ball, kinetic energy of your leg is transferred to the ball.

# Transformed (changed)

- Energy is continuously changing and transforming from one form into another form.
- · Example:

When the roller coaster goes down the hill, its potential energy is transformed into kinetic energy.

- Energy can be stored in many different forms.
- New energy cannot be created and also existing energy cannot be destroyed.
- When you eat food, your digestive system breaks down the food and changes it into energy stored in your body.

# Some changes of potential energy into kinetic energy.

Example	Energy changes	
	From	Into
Flashlight :	Chemical energy stored in batteries.	Light energy and thermal energy.
Gas oven :	Chemical energy stored in natural gas.	Thermal energy.
Spring-powered car toy :	Potential energy stored in the spring wire.	Kinetic and sound energies.
Real car :	Chemical energy stored in gasoline.	Kinetic, sound and thermal energies.
Electric fan :	Electrical energy.	Kinetic energy.
Door bell :	Electrical energy.	Sound energy.
Radio :	Electrical energy.	Sound energy.
Electric lamp :	Electrical energy.	Light and thermal energies.

# Review on Concept (2.3)

## 1 Scientific terms (Definitions):

Scientific terms	Definitions	
1. Speed :	It is the distance that an object travels in a certain amount of time.	
2. Collision :	It is the bumping or crashing of two objects into each other.	

#### 2 Importance or uses:

Items	Importance or uses		
1. Wrecking ball :	It is used to collide with walls of a building to help construction workers knock down walls or parts of buildings.		
2. Seatbelts :	They are used in cars to keep the driver and also the passengers from moving forward when the car stops suddenly.		
3. Airbags :	<ul><li>They slow the speed of the driver's motion forward.</li><li>They absorb the energy of the passengers on collision.</li></ul>		

### 3 Give reasons for :

1. Seatbelts in cars are very important.

Because the seatbelts are used in cars to keep the driver's body and also the passengers from moving forward when the car stops suddenly.

2. Airbags in cars are very important.

Because the airbags slow the speed of the driver moving forward and they absorb the energy of the passengers during collision.

The speed of the ball increases when the bat hits it hard. Because the kinetic energy of the bat transfers to the ball.

4. The speed of a truck is more than that of a small car when both of them roll down on the same ramp.

Because the truck has mass more than that of the small car, so the truck has speed and kinetic energy more than that of the small car.

When two objects collide with each other, you can hear a sound. Because a part of kinetic energy changes into sound energy.

6. Driving fast is very dangerous.

Because if the car increases its speed, its kinetic energy increases that results in exerting a large force during an accident.

7. A truck needs a bigger engine than that of a small car to move with the same speed.

Because the truck has more mass than that of the car.

A car consumes less fuel than that consumed in a bus to move at the same speed.

Because the car has a smaller mass than the bus so, it needs a smaller engine to be operated.

9. You can hear a sound during collision between marbles.

Because some of the kinetic energy changes into sound energy during collision.

The amount of energy before collision is equal to the amount of energy after collision.

Because the energy is conserved during the collision, so it cannot be destroyed.

## 4 What happens if ...?

- The moving cricket bat hits a ball. (according to the transfer of energy).
   The kinetic energy of the bat transfers to the ball.
- 2. Airbags in a car don't inflate during a crash.

The energy of collision will push the driver forward strongly that causes many harms to him.

The speed of a car increases.
 The kinetic energy of the car increases.

(according to its kinetic energy).

4. We increase the angle of inclination of a ramp on which a toy car moves. (according to the speed of the toy car).

The speed of the toy car will increase.

Two bicycle move in an opposite direction, collide with each other.The damage of the two bicycles would be much more severe.

Two cars move at different speeds in opposite directions collide with each other.

The forces exerted in the accident depend on the speed of both cars, so damage would be more stronger because they move in opposite direction.

7. Two cars move at different speeds in the same direction, collide with each other.

The forces exerted in the accident depend on the speed of both cars, this leads to damage that would be less stronger because they move in the same directions.

8. The pushing force that acts on an object decreases.

(according to its kinetic energy).

Its kinetic energy will decrease.

9. The kinetic energy of a moving car increases.

(according to the damage during collision).

The damage would be much more severe.

10. A truck and a small car move at the same speed.

(according to Kinetic energy).

The kinetic energy of the truck is more than that of the small car.

11. The Newton's cradle ball is raised up without leaving it go.

(according to its energy).

It stores potential energy and doesn't have any kinetic energy.

12. You let the ball of Newton's cradle move towards the rest of balls.

(according to the change of energy).

The potential energy changes into kinetic energy.

 Friction occurs between the string and the other parts of Newton's cradle during collision. (according to the change of energy).

Some of kinetic energy changes into thermal energy.

## 5 Importance law:

#### · Problems :

1. Find the speed of a runner, if you know that he covers 400 meters in 80 seconds.

Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{400}{80}$  = 5 m/sec.

2. Amir runs 100 meters in 20 seconds. Calculate the speed of Amir.

Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{100}{20}$  = 5 m/sec.

3. If a bus traveled 600 kilometers in 5 hours. Calculate the speed of the bus.

Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{600}{5}$  = 120 km/hr.

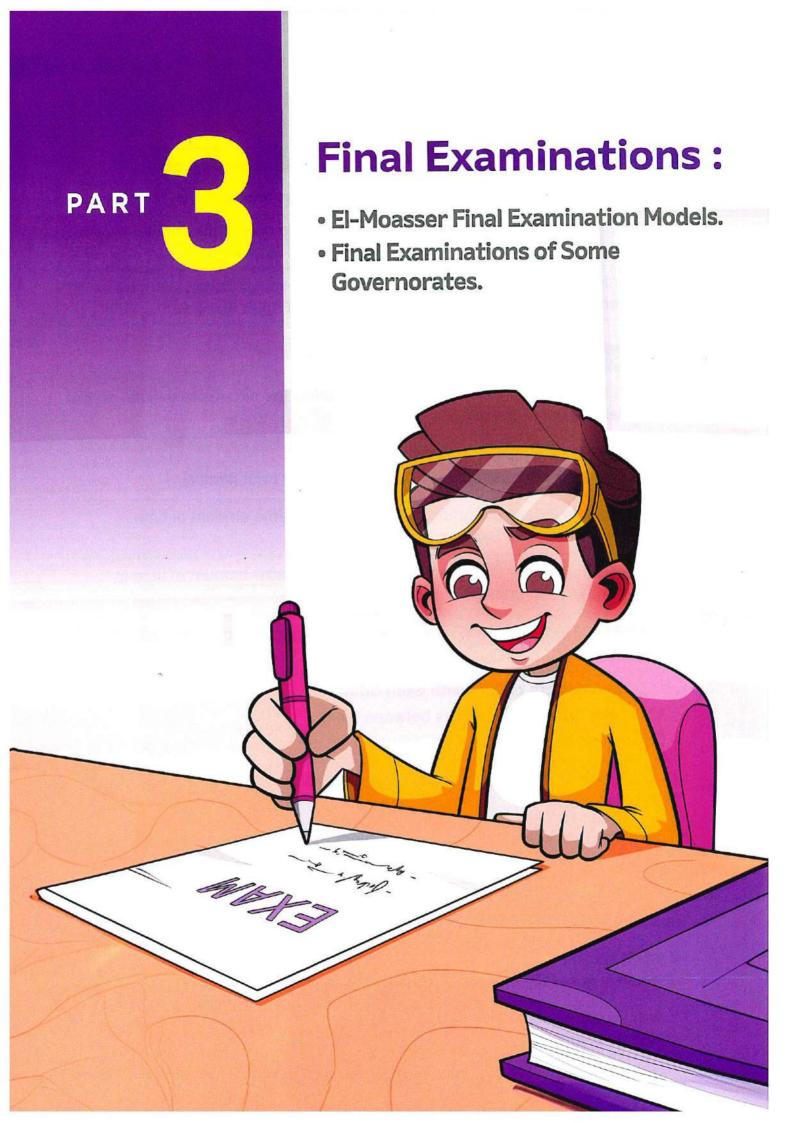
#### 6 Comparison:

Fast-moving object	Slow-moving object		
• It has more energy.	It has less energy.		
<ul> <li>When this object hits another object, it exerts more force.</li> </ul>	<ul> <li>When this object hits another object, it exerts less force.</li> </ul>		
<ul> <li>This force causes a big damage to the object that cannot be repaired.</li> </ul>	This force causes less damage to this object than the fast-moving object.		

#### 7 Main points:

- Vents in airbags are important because they allow the airbags to deflate, so the driver can get out of the car.
- · Common measuring units of speed :
  - Meter per second (m/sec).
- Kilometer per hour (km/hr).
- The object that travels the greater distance in the same amount of time is moving at a greater speed.
- The object that travels the same distance in the smaller amount of time is moving at a greater speed.
- By increasing the force, mass and speed of an object so, its kinetic energy increases.
- When two objects collide with each other:
  - An amount of energy transfers between them.
  - Changes of energy occur.
- During collision, there are changes of kinetic energy may be in the form of heat, light or sound.
- The amount of kinetic energy of an object depends on :
  - The mass of object.

- The speed of object.
- Some of kinetic energy in Newton's cradle changes into other forms of energy such as sound energy and thermal energy.
- If you leave the moving balls of Newton's cradle long enough, their kinetic energy decreases gradually until they stop after lots of collisions.
- Energy is conserved during collision, so it cannot be destroyed, and the amount of energy before the collision is equal to the amount of energy after the collision.



# **El-Moasser Final Examination Models**

# Model Exam 1

	(A) Choose the corre	ect answer :				
	1. The roots of kapo	k tree don't grow de	eply in the soil, becau	ıse		
	a. the soil contains less water.  b. the soil contains more wat					
	c. the climate is very cold.		d. the climate is very hot.			
		nsible for moving your of tea, is the	our hand away from d	3373	as	
	a. digestive	b. respiratory	c. nervous	d. stomach	1	
i e	3. Songs of humpba	ck whales in winter a	are characterized by	each of the fo	llowi	ng,
	a. it is for mating s	eason.	b. moving better t	hrough cold v	water	
	c. having soft sour	114 to 12 24 25	d. having low-pitched sounds.			
4. When you move something toward you, this represe						
	a. pushing force.		c. pulling force.		nera	<i>V</i>
	(B) Give a reason for		, , , , , , , , , , , , , , , , , , , ,			
	Seatbelts in cars a	Control of the Contro				
		no very important.				
	*		***************************************			•••
2	(A) Put (✓) or (X):					
	1. Digestion process	begins in stomach v	with the help of saliva		(	)
			humans do not have		xtra	,
	abilities are called	super sensory adap	tations.	, 4,14 1,1000 0	(	)
	3. Cats have exceller	(08)			ì	)
	4. The bus that cover			60 m/sec.	ì	)
	(B) What happens to		Total Control of the		•	,
	No. 1					
	The kinetic energy	of a moving car if its	s speed increases.			
	-	•••••		***************************************	********	
3	(A) Write the scientif		-			_
	<ol> <li>The part of the kap</li> </ol>	ok tree on which the	e buttress roots grow.	(		)
	<ol><li>It delivers message organs.</li></ol>	s between the spina	al cord and different b	oody		1

3. It is the force that is exerted when obje	cts rub against each other. ()				
4. One of the measuring units of time.	()				
(B) Find the speed of a runner, if you known in 30 seconds.					
	- —				
Model Ex	am 2				
1 (A) Complete the following sentences :					
<ol> <li>Engineers use to slow down the motion of the Shockwave truck.</li> </ol>					
2. The speed affects the energy of a moving object.					
3. In the electric bell, energy changes into energy.					
<ol> <li>Most animals can hunt when energy bounces off a prey into their eyes, while bats can hunt when energy bounces off a prey into their ears.</li> </ol>					
(B) Give a reason for the following:					
When your friend catches a ball that is the ball is stopped.	thrown in the air, the movement of				
trie bail is stopped.					
2 (A) Correct the underlined words:					
<ol> <li>Exhausts from factories and floods pro</li> </ol>					
	()				
2. The energy that is produced due to the					
parts of Newton's cradle, is the sound energy. (					
3. Hearing is one of the weak senses of jerboa. (					
4. The friction between the car's windows					
the car.	(				
(B) Classify the following materials into	opaque objects and transparent objects:				
(Wood – Air – Wate	er – Metal – Lenses)				
Opaque objects	Transparent objects				
	I .				

(A) Write the scientific term of ea	ch of the following:	
<ol> <li>A group of ants which is respons is a shortage of food.</li> </ol>	sible for sending smelly mes	sages when there
2. It is the force that pulls objects to	oward the Earth.	(
3. A structure that prevents the loss	s of water in the pine tree.	()
4. The organ used to differentiate to	petween different scents.	()
(B) A truck travels a distance of 16	50 kilometers in 2 hours. Fir	nd its speed.
Mode	el Exam 3	
1 (A) Choose the correct answer:		
<ol> <li>Which of the following sentences</li> </ol>	s describes the friction force	?
a. It pulls objects toward the grou		
b. It pushes objects away from the	ne ground.	
c. It slows down or stops the mov		
d. It doesn't affect the moving ob	jects.	
<ol><li>In penguin's body, the thick layer from</li></ol>	of fat and dense feathers p	rotect its body
a. cold air. b. cold water.	c. warm water. d. warr	n air.
<ol><li>The energy that is stored in an ol</li></ol>	bject due to its position, is kr	nown as
a. kinetic energy.	b. potential energy.	
c. electrical energy.	d. chemical energy.	
<ol><li>When you see a car coming towa away from it.</li></ol>	ard you, the sensory recepto	rs to get
a. in the ears send a signal to the	brain first	
b. in the eyes send a signal to the	e brain first	
c. in the eyes send a signal to ser	nsory receptors in the ears	
d. in the ears send a signal to ser	nsory receptors in the eyes	
(B) Give a reason for the following	:	
Mirror can reflect the light better	than a painted surface.	

2	(A) Put (✓) or (X):		
	1. The kinetic energy of a toy car pushed on a flat surface is equal to the kin	netic	`
	energy of another toy car pushed with the same force down a ramp.	(	)
	2. The main difference between pulling and pushing forces is the direction	,	١
	of the force.	( -l-	)
	3. Sharp spines are examples of adaptation of some plants to prevent anim	ais /	١
	from eating them.	· \	)
	4. As the height of an object from the Earth's surface increases, its potential	1	١
	energy increases.	,	,
	(B) Find the speed of a car that moves a distance of 240 Kilometers in 3 h	ours.	Ď.
			•••
2	(A) Write the scientific term of each of the following :		
	1. They include the eyes, nose, ears, tongue and skin, and they receive		
	information from the surroundings and send it to the brain. (		)
	2. They are present in car airbags, and allow them to deflate fast after		2000
	collision. (	•••••	)
	3. A type of surface that reflects light in different directions when		\
	the light falls on it.		
	4. A large muscle that contracts during breathing in and relaxes during brea		7.2
	out. (		)
	(B) Classify the following living organisms according to their habitats into organisms live in deserts and organisms live in forests in the table bell (Starred agama lizard – Panther chameleon – Fennec fox – Kapok tree Palm tree – Barbary fig plant).	low :	ii
	Organisms live in deserts Organisms live in forests	3	
			•••
			***
			•••

### Model Exam 4

1	(A) Write the scientific term of each of the	following:	
	1. A property that helps animals blend in wit	h their surrounding env	rironment.
		_	()
	2. A system that works inside the human bo	dy to keep the human a	
	danger.		()
	3. The energy that is used to operate televis		()
	4. The force that makes an object move a d	stance.	()
	(B) Give an example for the following:		
	A light source that presents in the sky.		()
2	(A) Choose the correct answer :		
	1. The potential energy of an object depends	s on	
	a. its mass only.		
	b. its height from the Earth's surface only.		
	c. its mass and its height from the Earth's	surface.	
	d. its temperature.		
	2is considered as a behavioral ada	ptation in the panther of	hameleon.
	a. Puffing up its body during danger		
	b. Each eye can move independently		
	c. V-shaped feet	d. Brightly colored sca	ales
	3. From the structural adaptation of water lily	plant is that has	****
	a. long roots.	b. needle leaves.	
	c. tiny leaves.	d. wide leaves.	
	4. All of the following are examples of motion	, except	
	a. a running person.	b. a ball travelling thro	ugh the air.
	c. a flying bird.	d. a sleeping dog.	
	(B) What happens if?		
	Humans stop throwing waste materials into ecosystem.	o waterways and soil in	an

3	(A) Correct the underlined words :		
	1. The balanced forces cause the object to move. (		)
	2. When you turn on a radio, the electrical energy changes into light energy	<b>/</b> .	
	(		)
	3. Potential energy depends on the speed of an object.		)
	4. The system that works with the eyes of living organisms for seeing object	cts is	
	the digestive system.		)
	(B) A deer runs a distance of 200 meters in 5 seconds. Calculate its speed		
	Model Exam 5		
1	(A) Choose the correct answer:		
	1. When a car suddenly stops, the passengers move		
	a. backward. b. forward. c. upward. d. downward.		
	2. Reading and writing are common types of communication in wo	rld.	
	a. humans b. animals c. birds d. plants		
	3. Bears that live in forests have fur that of polar bears.		
	a. whiter than b. darker than		
	c. similar to d. brighter than		
	4. When the roller coaster stops, its energy of motion		
	a. doesn't change. b. increases.		
	c. decreases. d. becomes zero.		
	(B) What happens if?		
	The length of acacia taproot doesn't exceed 3 meters downward.		
			.,,
			•••
			_
2	(A) Put (✓) or (X):	,	
	At night, cat's eyes look like small lighted lamps.	(	)
	2. The sandy-colored fur of caracal helps it blend in with snow in polar	,	١
	environment.	(	)
	3. After car collision, the airbags deflate as fast as they inflate.	(	)
	4 The stopped object can't move until a force acts on it.	(	,

## (B) Look at the following pictures, then choose if the forces are "balanced" or "unbalanced":



1. A book on a table (Balanced – Unbalanced)



2. A seesaw (Balanced – Unbalanced)

			(=	Ju Olivaiu	illoca)
3	(A) Write the sci	entific term of e	ach of the following	g:	
	<ol> <li>A type of foxes environment.</li> </ol>	s that has sandy	-colored fur to adapt	its desert	()
	2. It is the force t	hat pulls objects	toward the Earth.		()
	3. Safety equipm	ent used to prov	ride soft cushion, wh g collision of cars.	en it is inflat	ed
			at and has long, stro	na roots to .	()
	the water wave	es.	at and has long, stro	ing roots to r	esist ()
	(B) Give a reason	for the following	201	+	()
	Acacia liee lia	s very long trunk	<b>C.</b>		
	•••••••••••••••••••••••••••••••••••••••	•••••••			
	•••••••••••••••••••••••••				
		Mod	lel Exam 6		
1	(A) Choose the co	rrect answer :			
			t objects, except		
	a. glass.	b. metal.		d. air.	
	2. When an objec	t is in motion, th	is means that its		96
	a. color	b. shape	c. size	d. positior	
	3. Pine tree has a		e to make snow slide	Services Services and Services	
	breaking it. This climate like the	s structural adap	station makes this tre	ee face the e	extreme cold
	a. caracal.	b. penguin.	c. fennec fox.	d. brown l	oear.
	4. If there is nothin	ng to stop the m	ovement of an objec		
	a. stay in motion		b. suddenly stop		
	c. stop after few	minutes.	d. stop after few		

Some animals have the ability to make	
(A) Put (✓) or (X):	
1. Unbalanced forces keep an object in its	place without moving. (
2. The moving objects only have energy,	while the objects that don't move
have no energy.	c can warm up the warm blood
<ol><li>In penguin's feet, the cold blood vessel vessels.</li></ol>	s can warm up the warm blood
4. The moon is not considered as a light s	source. (
(B) Classify the following animals in the	table below :
	olphin – Owl – Bat)
Animals have super sight sense	Animals have super hearing sense
<ol> <li>the nutrients through its walls.</li> <li>A feature in the bull shark, in which the is darker than its lower surface.</li> <li>The ability to do work or cause a change.</li> <li>The organ used to differentiate between types of food.</li> <li>Amir rides his bike and covers a distance calculate the speed of the bike.</li> </ol>	ge. ( en the taste of different (
Model Ex	am 7
(A) Choose the correct answer:  1. Camouflage means that the animal  a. can be seen easily among its surroute.  b. is hard to be seen among its surroute.	unding.

The five senses of humans and animals include		
<ol> <li>sight, hearing, touch, smell, and movement.</li> </ol>		
b. sight, movement, taste, touch, and smell.		
c. taste, touch, movement, hearing, and smell.		
d. sight, hearing, taste, smell, and touch.		
3. When an object moves down a ramp, its stored energy		
a. increases.		
b. doesn't change.		
c. changes to a less active form of energy.		
d. changes to a more active form of energy.		
<ol> <li>The structural adaptation that helps the fishing cat to catch a prey at night is that</li> </ol>	ıt,	
<ol> <li>it can feel the heat of prey's body.</li> </ol>		
b. it can hide inside the forest.		
c. it can digest its prey easily.		
<ul> <li>d. it has a mirror-like membrane at the back of its eyes.</li> </ul>		
(B) What happens if?		
	duri	na
(B) What happens if?  Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of each of the change of each of the change of each of the change of the ch		
Friction occurs between the string and the other parts of Newton's cradle		
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of e		
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of each of the change	ener	
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of each of the change of the	ener	
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of each of the change of the	ener	
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of each of the collision)  (A) Put (V) or (X):  1. Being exposed to air rich in dust for a long time harms the human respirate system.  2. If two objects travel for equal periods of time, the object that travels	ener	
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of exposed to air rich in dust for a long time harms the human respirat system.  2. If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.	ener	
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of exposed to air rich in dust for a long time harms the human respirat system.  If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.  When an object moves faster, it gains larger amount of kinetic energy.	ener	
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of exposed to air rich in dust for a long time harms the human respirat system.  2. If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.	ener	
Friction occurs between the string and the other parts of Newton's cradle collision. (according to the change of each of the collision) (according to the change of each occurs of the change of each occurs occurs of the change of each occurs occ	tory ( ( (	gy) ) ) )
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of exposed to air rich in dust for a long time harms the human respirat system.  1. Being exposed to air rich in dust for a long time harms the human respirat system.  2. If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.  3. When an object moves faster, it gains larger amount of kinetic energy.  4. Camouflage helps animals adapt the extreme weather conditions in their	tory ( ( (	gy) ) ) )
Friction occurs between the string and the other parts of Newton's cradle collision. (according to the change of each collision) (according to the change of each collision) (according to the change of each collision).  2 (A) Put (V) or (X):  1. Being exposed to air rich in dust for a long time harms the human respirate system.  2. If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.  3. When an object moves faster, it gains larger amount of kinetic energy.  4. Camouflage helps animals adapt the extreme weather conditions in their ecosystems.  (B) Find the speed of a horse, if you know that it covers 250 meters in 5 seconds.	tory ( ( (	gy) ) ) )
Friction occurs between the string and the other parts of Newton's cradle collision. (according to the change of example	tory ( ( (	gy) ) )
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of exposed to air rich in dust for a long time harms the human respirat system.  If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.  When an object moves faster, it gains larger amount of kinetic energy.  Camouflage helps animals adapt the extreme weather conditions in their ecosystems.  (B) Find the speed of a horse, if you know that it covers 250 meters in 5 seconds.	tory ( ( cond	gy) ) ) ds.
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of example	tory ( ( cond	gy) ) ) ) ds.
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of example of example of example of example of example of exposed to air rich in dust for a long time harms the human respirate system.  If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.  When an object moves faster, it gains larger amount of kinetic energy.  Camouflage helps animals adapt the extreme weather conditions in their ecosystems.  By Find the speed of a horse, if you know that it covers 250 meters in 5 sees.  A process through which the body gets oxygen from the air and expels out carbon dioxide.  An animal that has different bright colors to provide camouflage in its	tory ( ( cond	gy) ) ) ds)
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of exposed to air rich in dust for a long time harms the human respirat system.  If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.  When an object moves faster, it gains larger amount of kinetic energy.  Camouflage helps animals adapt the extreme weather conditions in their ecosystems.  (B) Find the speed of a horse, if you know that it covers 250 meters in 5 seconds.  (A) Write the scientific term of each of the following:  1. A process through which the body gets oxygen from the air and expels out carbon dioxide.  2. An animal that has different bright colors to provide camouflage in its environment and has V-shaped feet.	cond	gy) ) ) ds)
Friction occurs between the string and the other parts of Newton's cradle collision.  (according to the change of example of example of example of example of example of exposed to air rich in dust for a long time harms the human respirate system.  If two objects travel for equal periods of time, the object that travels a greater distance has a slower speed.  When an object moves faster, it gains larger amount of kinetic energy.  Camouflage helps animals adapt the extreme weather conditions in their ecosystems.  By Find the speed of a horse, if you know that it covers 250 meters in 5 sees.  A process through which the body gets oxygen from the air and expels out carbon dioxide.  An animal that has different bright colors to provide camouflage in its	cond	gy) ) ) ds)

	system that has a high level of air pollution
Model	Exam 8
(A) Put (✓) or (X):	
1. A moving object is not affected by fr	riction force. (
2. Some animals prefer hunting during	the night than hunting during the day. (
3. The object that travels down a ramp	
	which humans and animals depend on
to see the surroundings.	(
(B) Give a reason for the following:	
The measuring unit of speed is km	/hr or m/sec.
(A) Character and a province to	
(A) Choose the correct answer:	increases, the kinetic energy of an object
moving down it will	increases, the kinetic chargy of an object
a. decrease. b. increase.	c. remain as it is. d. be destroyed.
2. The mirror-like membrane present a	at the back of eyes of
a. humans only.	b. cats only.
c. both humans and cats.	d. neither humans nor cats.
3. Umbrella-shaped trees include	
a. mangrove tree and acacia tree.	
c. acacia tree and kapok tree.	d. barbary fig and water lilies.
4. Fennec foxes and arctic foxes live i	in burrows, this belongs to
adaptation.	
a. only structural	b. only behavioral
c. both structural and behavioral	
(B) A train travels from Cairo to Alex	andria for a distance of 220 kilometers in
2 hours. Find its speed.	
(A) Correct the underlined words :	

3. The sense of eyesight of owls is weaker than that in bats. (		)
4. Groups of ants within a colony have similar roles.		)
(B) What happens if?  The amount of food in the ant's colony decreases.		
		*******
Model Exam 9		
1 (A) Complete the following sentences :		
The sight sense can be performed through and		
<ol> <li>When two cars move on the same road, car (A) moves at speed equals 10 m/sec., and car (B) moves at speed equals 20 m/sec, this means tha moves longer distance than car in the same time.</li> <li>Humans, amphibians and reptiles have to breathe oxygen gas in while fish has to breathe oxygen gas in water.</li> </ol>	n air,	
4. Among safety equipment used during collision of cars are and		
(B) Give a reason for the following:		
If you push two similar toy cars, one of them may travel for a longer dist than the other.	ance	Э
······································		
2 (A) Put (V) or (X):		-
1. As human needs clean water to drink, fish needs clean air to breathe.	(	)
<ol><li>Seatbelt is one of the safety equipment in cars.</li></ol>	(	)
<ol><li>Animals communicate with each other by using different senses.</li></ol>	(	Ś
4. The desert lizard blend in with large green trees, to hide from its enemies	i. (	)
(B) Find the speed of a runner, if you know that he covers 400 meters in 20 so		de
, y = 1 and the covers 400 meters in 20 st	COII	us.
(A) Choose the correct answer :		
All the following sentences about energy are correct, except		
a. it can be stored in an object.		
b. it can be transferred from an object to another one.		
<ul> <li>c. it can be transformed from one form into another one.</li> </ul>		
d. it can be destroyed and cannot be created.		
<ol><li>The blind person's cane and emit a high-pitched sound that boun objects forming an echo.</li></ol>	ces	off
a. lizards b. polar bears c. bull sharks d. bats		

**Final Examination** 

3.	Speed is a mea	asurment of hov			
	a. long	b. tall	c. fa	st	d. heavy
4.	A very big truck	needs			
	a. very small ei			nall engine	
	c. very big eng			engine	
(B)	Write the sens	ses that can be	used in e	ach of the fol	lowing types of
	communication	on in the table l	elow:		
		40.1975			
	Types o	of communicati	ion	The	e used senses
	1. Watching T	V.			
	2. Flashing lig	hts of fireflies.			
	3. Echolocatio	on in dolphins.			
	4. Using the c	ell phone.			
				10	
		Мо	del Exa		
(A	) Choose the c	orrect answer :			
		ars are			
	a not able to r	oroduce sound	energy.	b. not able to	produce kinetic energy.
		taining energy t			daptation to live and survive.
2		ctions are consi			
	a. force.	b. device.		c. energy.	d. adaptation.
3			II the follo	wing functions	s, <u>except</u>
٥.	a. gathering in				g information.
	c. sending sign			d. falling of r	
1			asured in	Section 1	ters per second.
4.			addica iii .	b. grams per	
	a. kilograms p			with the base	per kilometers
	c. kilometers p			u. Kilograms	per kilomotoro
(B	· It is a second of the second	n for the follow		T. 1	landa ila
		ord plays an imp	ortant role	e in the nervol	us system to do its
	function.				
	***************************************			***************************************	

2 (A) Complete the following sentences :	
<ol> <li>When you push a table on the floor, the transfers from your body to the table.</li> </ol>	
<ol><li>Echolocation property is used by some animals such as to locate their preys.</li></ol>	
<ol><li>Most of energy in the Newton's cradle is transferred from the first ball to the rest of balls.</li></ol>	)
4. To increase the energy of any moving object we must increase its speed.	
(B) A car moves forward a distance 100 kilometers in time equals 2 hours. Calculate the speed of the car.	
	•
3 (A) Put (✓) or (X):	-
If two objects cover the same distance in the same time, so they have the same speed.      ( )	
2. In a complete dark room, you can use the senses of touching, tasting, smelling	
and hearing only.	1
3. The moving objects only have energy, while the objects that don't move have	
no energy. ( )	
<ol> <li>We cannot create a new form of energy, and also we cannot destroy an existed form of energy.</li> </ol>	
( )	
(B) You have some pictures of different parts of the human body. Write down the organ number in front of the system to which it belongs in the following table :	

System name	Organ number
1. Digestive system :	
2. Respiratory system :	
3. Nervous system :	

(3)

(2)

(1)

## **Final Examinations** of some governorates

## on the first term 2024



1 Cairo Governorate Heliopolis Educational Zone	
1 (A) Complete the following sentences using the words between brackets:	
1. The firefly beetle uses to communicate. (smell – light – ech	0)
2. During inhalation, the diaphragm muscle	
(contracts – relaxes – does not mov	e)
3. When a ball is left to fall from up, it gains energy.	
(chemical – potential – kineti	ic)
4. When a moving car stops suddenly, so the passenger moves to	
(right – forward – backwar	d)
(B) Mention the function :	
The nervous system consists of brain, spinal cord and nerves.	
1. The brain function :	
2. The nerves' function :	••••
2 (A) Put (V) or (X):	
1. The moon is a source of light. (	)
<ol><li>The cats adapt in the dark as they have a transparent membrane. (</li></ol>	)
3. The gravity force causes decreasing the object speed. (	)
4. The work is the force that slows the moving object. (	)
(B) Look at the figure and answer the following:	
If the two cars move in the same time for 10 seconds, car (A) covers a distance 300 meter and car (B) covers a distance 100 meter. Which car is the faster?	

3 (A) Choose the correct	answer:		
<ol> <li>The Savannah environ these plants adapt with the second terms of the seco</li></ol>			
a. small leaves reduc		J	<u> </u>
b. long roots.			
c. large leaves to get	light.		
d. stem stores water.			
2. Which of the followin	g groups reflects ligh	t when it fall on the	m ?
a. Aluminum foil – bri			
b. Mirror – Aluminum	foil - metal spoon.		
c. Mirror – wooden bo	oard – metal spoon.		
d. Metal spoon – card	dboard box – mirror.		
<ol><li>From the potential en</li></ol>	ergy form is	***	
a. television remote.		b. telephone sour	nd.
c. electric fan.		d. electric lamp li	ght.
<ol><li>All the following are s</li></ol>	tructural adaptations	, <u>except</u>	
a. thick layer fats in p		b. countershading	g in humpback.
c. white thick fur of po	olar bear.	d. hiding in burro	ws of fennex fox.
(B) Cross out the odd w	ord:		
Small intestine – Sto	mach – Trachea – La	arge intestine.	()
2 Cairo Gove	ernorate	Maadi Educat	ional Zone
		Madai Badaa	ional Zone
1 (A) Choose the correct a			
All the following are tr .	25 A	ccept	
a. glass.	b. water.	c. wood.	d. air.
2. The presence of a thic			
a. polar bear.	b. forest bear.	c. desert lizard.	d. bat.
3 energy is p			
a. Light	b. Sound	c. Thermal	d. Chemical
4. The force that tries to			
a. gravity.	b. friction.	c. push.	d. pull.
(B) Why do humpback w	hales sing different	songs ?	

2 (A) Put (V) or (X):			
1. Digestion proces	s starts in the mouth.		( )
2. Fishing cat cannot see in the dark.			( )
3. Tug-of-war game	depends on pushing	force.	( )
4. Light energy is a	form of kinetic energy	y.	( )
(B) Write the scient	tific term of the follo	wing :	
The main control	center in the human	body.	()
(A) Complete the f	ollowing sentences u	sing the words be	etween brackets:
1. Fish use	to breathe in wate	r.	(lungs – gills)
2 is a fly	ing animal depends o	on echolocation to	find food. (Firefly – Bat)
<ol><li>When the speed</li></ol>	of the object increase	es, its kinetic energ	gy
			(increases – decreases)
4. Shockwave truck	c is than no	ormal truck.	(slower - faster)
(B) Look at the figu	ire and answer:		
	Figure (a)	Figure (	(b)
Which figure is o	onsidered a mirror su	rface ? Why ?	
3 Cairo	Governorate	El-Nozha	Educational Zone
1 (A) Choose the cor	rect answer:		
1. All the following	are light sources, exc	ept	
a. the Sun.	b. fire.	c. eyes.	d. light lamp.
2. When an objects	s is in motion, this me	ans that its	changes.
a. color	b. shape	c. size	d. position

F1	-		
rınaı	Exam	ınat	ion

a. is an amphibian. b. is bumping or crainto each other. c. produces light an d. are opaque mate	d heat energy.
a. is an amphibian. b. is bumping or crainto each other. c. produces light an	shing of two object
a. is an amphibian. b. is bumping or cra	
a. is an amphibian.	
	В)
	В)
s it in column (A) :	
produce.	
force.	(
•	(
g car, the distance that	it moves will
	(
	(
c. lung	d. gills
ater.	
	c. lung  nly.  and lenses. g car, the distance that  force.

Shape of ears :

4	Cairo Governorate	Helwan Edu	icational Zone
1. 2. 3. 4.	(acacia tree – ener ) The ability to do work and it can chang is called	gy – brain – increasone from one form to a system. ater.	es) another
	Bats can hunt their preys at night.		
2 (/	A) Choose the correct answer:		
1	. Animals are active at night are called		
	a. endangered. b. extinct.	c. nocturnal.	d. diurnal.
2	. paper and wood are materia		
	a. opaque b. shiny	c. liquid	d. gases
3	. All the following are examples of motion		
	a. flying bird.	b. sleeping dog d. a ball traveli	E - CANADA -
1	c. running person produce high pitched sound		ng tinough an.
4	a. Owls	b. Humpback v	vhales
	c. Toads	d. Salamander	
/1			
(1	3) What happens if? There is a danger near to an ants colo	nv	
	There is a dariger floar to air arite colo		
3 (	A) Choose from column (B) what suits i	t in column (A):	
	(A)		B)
	1. Mangrove tree	a. gravity force.	
	2. From safety equipment in cars	b. has role in respir	
	3. The force that attracts bodies	c. has long and stro	ong root.
	towards the Earth	d. airbag.	
	4. Diaphragm		

3. .....

(B) Who am I? I have a mirror-like	membrane at the bac	k of eves to see at r	aight /	
	vernorate	Awseem Educ		)
1 (A) Choose the correct		Awseem Educ	ational zone	
When you move so		hio roproporta		
	b. light energy.			
	b. Heavy cloth		d. Many feathers	
<ul><li>a. Speed</li><li>4. The bag is consider</li></ul>	b. Work	c. Gravity	d. Energy	
a. a transparent c. a shiny	Annua af Alia falla d	b. an opaque d. a semi transpa	rent	
(B) Write the scientific The first organ of the	respiratory system.	g :	()	
2 (A) Put (\( \sigma \) or (\( \text{X} \) :			*	
1. The penguin is a bird			( )	
2. The moon is a source	V <del>10</del> 1	e. 558 6	( )	
<ol> <li>The chemical energy</li> <li>Heat energy can be</li> </ol>		in the battery.	( )	
(B) Classify the followi	ng into structural or l	behavioral adaptati	ion :	
	some plants like acac		()	
(A) Complete the follows     1. There are two forces     forces.	(kinetic – brain – all d	irections – pulling)		
<ul><li>2. The eye sends mess</li><li>3. As the motion of an of</li><li>4. Owl's head turns in</li></ul>	bject increases, its	energy inc		
(B) Mention an example An insect that commu	The state of the s		()	

6	Giza Gove	rnorate	Agoza Educat	tional Zone	
1 (	A) Choose the correct a	answer :			
	. Reading and writing a		of communication betw	veen	
	a. animals.	b. humans.	c. plants.	d. birds.	
2	. When an object is in i	motion, this mean	s that its ch	anges.	
	a. color	b. shape	c. position	d. size	
3	. Which of the following	g can turn its head	d in all directions?		
	a. Lizard.	b. Owl.	c. Cat.	d. Cow.	
4	is the abilit	y to do work or m	ake a change.		
	a. Speed	b. Work	c. Energy	d. Displacemen	ıt
(	3) Cross out the odd w	ord :			
1.	Nose – Trachea – Sto			(	)
_					-
2 (	A) Put $(\checkmark)$ or $(x)$ :				
1	. The fennec fox has s	hort ear.		(	)
2	. Potential energy is th	e energy of movir	ng body.	(	)
3	. Light travels in straigl	nt lines.		(	)
4	. Digestion process be	gins in stomach w	ith the help of saliva.	(	)
(1	B) Give a reason for th	e following:			
	Bats can't see at nigh	nt, but they can hu	int their preys.		
					<b>(</b> :
			to or the community heaters a	m hundrote i	_
3 (	A) Complete the follow			m prackets:	
			- Eye – Mangrove)		
	is the orga		e to receive light.		
	is an opaq	TO THE CONTROL OF THE			
	. Fish have				
4	tree has lo	ong and strong roo	ots to resist water wave	<b>∋</b> S.	
(	B) Correct the underlin	ned word:			

Stomach is the main control center in the body of the human. (......)

7 Alexandria Gove	rnorate	Al Montaza Ec	lucational Zo	ne
1 (A) Put (🗸) or (X) :				
1. Wood is from transparen	materials.			1
2. A compressed spring sto		erav.		(
3. Animals that are active d		100 T	nal animale	1
4. The stopped object can't			iai ai iii iiais,	(
(B) Cross out the odd word				1
		bork Assessing		
Panther chameleon – Fei	inec lox – bull s	nark – Agama lizar	a. (	••••••
(A) Complete the following	sentences using	g the words betwe	en brackets :	
		t – predator – nose		
1. The kapok tree spreads the			₹000	
2. light travels in				
	n that sends infe	ormation through n	erves to the l	orain
3. The is the orga		annada an oaga a		
when you smell perfume.		oaugm		
when you smell perfume.  4. Fish use to bre	athe in water.			
when you smell perfume.  4. Fish use to bre  (B) Write the scientific term	athe in water. of the following	g :		
when you smell perfume.  4. Fish use to bre	athe in water. of the following	g :		
when you smell perfume.  4. Fish use to bre  (B) Write the scientific term	athe in water. of the following	g :	seasons.	241223333 <b>3</b>
when you smell perfume.  4. Fish use to bre  (B) Write the scientific term  A fox that changes its fur of	athe in water. of the following color between w	g :		
when you smell perfume.  4. Fish use to bre  (B) Write the scientific term  A fox that changes its fur of	athe in water.  of the following color between ween:	g : inter and summer s		
when you smell perfume.  4. Fish use to bre  (B) Write the scientific term  A fox that changes its fur of  (A) Choose the correct answer.	athe in water.  of the following color between we ser:  ns of codes, excepts	g : inter and summer s	(	
4. Fish use to bre  (B) Write the scientific term  A fox that changes its fur of the scientific term  A fox that changes its fur of the scientific term  (A) Choose the correct answer 1. All of the following are form	athe in water.  of the following color between we ser:  ns of codes, excepts	g : inter and summer s ept	(	
A fox that changes its fur of the following are form a. thumb up and down har c. writing.	athe in water.  of the following color between we ser:  ns of codes, excends.	g: inter and summer s ept b. face expression d. swimming.	ns.	
A fox that changes its fur of the following are form a. thumb up and down har c. writing.  When you smell perfume.  4. Fish use to bre to bre (B) Write the scientific term A fox that changes its fur of (A) Choose the correct answer.  (A) Choose the correct answer.  1. All of the following are form a. thumb up and down har c. writing.	athe in water.  of the following color between we ser:  ns of codes, excends.	g: inter and summer s  cept  b. face expression d. swimming. u, this represents	ns.	
A fox that changes its fur of the following are form a. thumb up and down har c. writing.  When you smell perfume.  4. Fish use to bre to bre (B) Write the scientific term A fox that changes its fur of the fox that changes its fur	athe in water.  of the following color between water:  ns of codes, excends.  g away from you light energy.	g: inter and summer s  ept  b. face expression d. swimming. u, this represents c. pulling force.	ns.	
<ul> <li>when you smell perfume.</li> <li>4. Fish use to bre</li> <li>(B) Write the scientific term         A fox that changes its fur of </li> <li>(A) Choose the correct answer.</li> <li>1. All of the following are formal. thumb up and down hare converting.</li> <li>2. When you move something a pushing force.</li> <li>3. Digestion process begins in the process.</li> </ul>	athe in water.  of the following color between water:  ns of codes, excends.  g away from you light energy.	g: inter and summer s  ept  b. face expression d. swimming. u, this represents c. pulling force.	ns.	nergy.
<ul> <li>when you smell perfume.</li> <li>4. Fish use to bre</li> <li>(B) Write the scientific term             A fox that changes its fur of the following are form             a. thumb up and down hard c. writing.</li> <li>2. When you move something a pushing force.</li> <li>b.</li> <li>3. Digestion process begins in the following force.</li> </ul>	athe in water.  of the following color between we ser:  ns of codes, except ands.  g away from you light energy.  n the	g: inter and summer s  ept  b. face expression d. swimming. u, this represents c. pulling force.	ns. d. sound e	nergy.
when you smell perfume.  4. Fish use to bre  (B) Write the scientific term  A fox that changes its fur of  (A) Choose the correct answ  1. All of the following are form a. thumb up and down harm c. writing.  2. When you move somethin a. pushing force. b.  3. Digestion process begins in a. stomach. b.	athe in water.  of the following color between we ser:  ns of codes, except ands.  g away from you light energy.  n the	g: inter and summer s  ept  b. face expression d. swimming. u, this represents c. pulling force.	ns. d. sound e	nergy.
when you smell perfume.  4. Fish use to bre  (B) Write the scientific term   A fox that changes its fur of  (A) Choose the correct answ  1. All of the following are form   a. thumb up and down har   c. writing.  2. When you move somethin   a. pushing force. b.  3. Digestion process begins if   a. stomach. b.  4. Bull shark can hunt in	athe in water.  of the following color between we ser:  ns of codes, except ands.  g away from you light energy.  n the	g: inter and summer s ept  b. face expression d. swimming. u, this represents c. pulling force.  c. mouth.	ns. d. sound e	nergy.
when you smell perfume.  4. Fish use to bre  (B) Write the scientific term   A fox that changes its fur of  (A) Choose the correct answ  1. All of the following are form   a. thumb up and down har   c. writing.  2. When you move somethin   a. pushing force. b.  3. Digestion process begins if   a. stomach. b.  4. Bull shark can hunt in	athe in water.  of the following color between water:  ns of codes, except of a way from you light energy.  In the	eptb. face expression d. swimming. u, this represents c. pulling force. c. mouth. b. salt water only.	ns. d. sound e	nergy.

#### 8 Alexandria Governorate

#### Borg Al-Arab Educational Zone

	ose the correct a					
1. All the	e following organs	s belong to the r	espiratory system, exce			
a. nos	se.	b. two bronchi	. c. two lungs.	d. stom	ach.	
2	are nocturn	al animals with	bowl-shaped faces.			
a. Ow	⁄ls	b. Dogs	c. Mongooses	d. Bats		
3. When	a car suddenly s	stops, the passe	engers move			
	ckward.	b. forward.	c. upward.	d. dowr	าward.	
4. Wher	the roller coaste	er stops, its kine	tic energy			
	esn't change.	b. increases.	c. decreases.	d. beco	mes ze	ro.
	a reason for the e are sharp spine		aves of acacia tree.			
(A) D (	( 4) (14) -			-		
2 (A) Put	The state of the s	-:-bass daflata	as fast as they inflate		1	)
			as fast as they inflate.	f	(	)
			is better than fishing car		vith (	,
3. Bodie scale		na lizaru anu pa	anther chameleon are co	verea w	(	)
-		a slow down the	e speed of Shockwave to	ruck auic	klv. (	)
		O SIOW GOWII LIN	o opood of officernate a		,	,
0.00	t happens if?					
The a	amount of food in	the ants colony	decreases.			
			d f. IId			
	te the scientific t			,		,
			eathe in air and in water.			
2. The	energy that is sto	red in food and	batteries.	30		)
3. The f	time taken by org	anism's body to	respond to different info	ormation.	•	١
4. It is t	he force that is e	xerted when obj	ects rub against each of	ner. (		)
(B) Class	sify the following		opaque objects, and tra r – Water – Metal)	nsparen	t object	s:
	Opaque	objects	Transparent object	ets		

9 El-Menoufia Governorate	Tala Educational Zone	
1 (A) Cross out the odd word:  1. Fennec fox – Desert lizard – Caracal – Cha 2. Acacia tree – Polar bear – Penguin – Pine for 3. Sound energy – Light energy – Electrical energy 4. Trachea – Alveoli – Stomach – Throat.  (B) What's the type of adaptation?  Changing the color of fur of arctic fox.	ree. (	) )
2 (A) Write the scientific term for each of the form 1. One of the safety equipment in the car. 2. It is the visible form of energy. 3. It is a type of force that makes objects move 4. It is tree that is found in snow and has a tria (B) A train moves from Cairo to Alexandria co Calculate the speed.	( ( a away from you. ngle shape.	) )
3 (A) Put (✓) or (X):		
1. When a car crashes into a wall, it will not sto	p. (	)
<ol><li>We eat food to obtain energy.</li></ol>	(	)
<ol><li>Amphibians include frogs and salamanders.</li></ol>	ì	)
<ol><li>Wood is a transparent object that allows ligh</li></ol>	t to pass through.	)
(B) What happens if?  The diaphragm moves downward during inha	alation.	
10 Dakahlia Governorate	Dakahlia Educational Zone	
1 (A) Choose the correct answer:		
1is considered a behavioral adapta	tion in living organisms.	
	. Thick fur	
	. Living in burrows	
2. When exposed to danger, the system		
	digestive	
	respiratory	

3. In the opposite figure:  The body is under the effect of	Strong force	
2 (A) Put (V) or (X):		
<ol> <li>Palm tree has thick trunk and narrow leaves.</li> </ol>	(	)
<ol><li>The echoes help dolphins determine the location of preys.</li></ol>	(	)
<ol><li>Friction is a force that opposes motion.</li></ol>	(	)
<ol> <li>Seatbelts keep the driver and passengers from moving forward whe the car stops suddenly.</li> </ol>	n (	)
(B) What happens if?		
The mirror-like membrane in the fishing cat's eyes is not present.		
3 (A) Complete the following sentences:		
1. Food is digested completely in		
2. The spinal cord is one of the main parts of system.	d then she is	c
<ol> <li>If Noor travels with her bicycle a distance of 20 km in two hours, and moving at a speed of km/h.</li> </ol>	, literi site i	0
4. When you kick a ball upward, force affects on it.		
(B) Give a reason for the following:		
Opaque objects form shadows.		

Suez	Governorate	Science I	nspectorate	
1 (A) Choose the c	orrect answer :			
	es in zigzag paths.			
a. Snake	b. Jerboa	c. Dolphin	d. <b>Owl</b>	
<ol><li>All of the follow</li></ol>	ing are components of	digestive system, ex	cept	
a. spinal cord.	b. stomach.	c. mouth.	d. liver.	
<ol><li>The speed of a</li></ol>	car that travels 400 m	eters in 40 seconds is	S	
a. 400 m/sec.	b. 100 m/sec.		d. 40 m/sec.	
<ol><li>The form of ene</li></ol>	ergy that is stored in boo	ok placed on a table is	energy.	
a. potential	b. electrical	c. chemical	d. kinetic	
(B) Give a reason	for the following:			
	is different from exhale	ed air.	*	
		***************************************	-4	
(A) Put (V) or (X)				
	can move faster than a		(	)
	is a structural adaptatio		(	)
	waves in communicati		. (	)
	of the safety equipmen	it in cars.	(	)
(B) What happens				
The amount of t	food in the ant colony d	lecreases.		
				•••
				••
(A) Complete the	following sentences us	sing the words helow		_
	olphins – increases – de			
1. When the speed	of object increases, its	s kinetic energy	wilale)	
	used by some animals			
	tween the car tires and		ts snood	
4 sings	under water for comm	unication.	io specu.	
(B) Which of the fo	llowing materials is a erial?	transparent material		
Air :				
Rocks :		***************************************		

12 Damietta Governorate	Damietta Edu	icational Zone	
1 (A) Choose the correct answer:			
1. The ability to do work or make change is			
a. speed.	b. work.		
c. displacement.	d. energy.		
2. Dolphins depend on their sharp senses of	to get	food.	
a. sight b. taste	c. smell	d. hearing	
3. The form of energy that can be seen is	energy.		
a. thermal b. light	c. electrical	d. sound	
4. A wrecking ball is made of			
a. plastic. b. nylon.	c. steel.	d. wood.	
(B) Give a reason for the following:  Arctic fox has a thick fur coat.			
1. Seatbelt is one of the safety equipment in 2. Nocturnal animals have bigger eyes than 3. Energy doesn't transfer from an object to a 4. Animals can't eat barbary fig due to its sha  (B) Correct the underlined word:  Gills are unique behavioral adaptation tha	humans. another. arp spines. t allow fish to brea	( ( ( ( athe under water. (	) ) )
3 (A) Choose from column (B) what suits it in	Column (A) .	(D)	
(A)	versustii e teasiisiibatii	(B)	
Humans get energy from	a. gravity		
2. The force that attracts bodies toward			
Earth 3. The distance covered in a unit time	c. pine tre	ee.	
The distance covered in a drift time     Grow in amazon rainforest	d. speed. e. food.		
1	3	4	

13	El-Behira Gover	rnorate	Kafr El-Dawa	ar Education Zone
1. Fenn 2. The s 3. Firefl 4. Bull s (B) Men	nplete the following nec fox hasspeed of Shockwave by beetles use their sharks use strategy to tion the transforma energy ch	colored fur the truck is truck is truck is to release to sneak up on partion of energy	kilometers pe ease flashes. preys called when compressed	er hour.
<ol> <li>Roots</li> <li>The f</li> <li>Form</li> </ol>	te the scientific term of kapok tree make force that pulls object of energy which the I sacs surrounded wi	e it stable in mud ts downward. light waves mo	d and sand soil.	( () () from air.
shou	ecrease the collision Id be available to avon one example of s	oid collisions.		() safety equipment
1. The a a. sma 2. The m a. brai		s in the digestiv b. large int the human boo b. blood.	estine. d dy is	c. esophagus. c. lungs.
is a. bloo	n fish are considered	b. heart.	C	: reflex action.

(B) Two cars start to move at same time in 20 seconds, car (a) covers 100 m when

car b covers 300 m. Which car moves faster?

#### 14 Beni-Suef Governorate

#### Science Inspectorate

1	(A) Choose the correct a	answer:			
	1. To communicate throu	igh sight sense, we	need		
	a. making sound.		b. availability of lig	ght.	
	c. heavy music.		d. touching some	thing.	
	2. An animal has ability	to turns head in all d	irection is	***	
	a. snake.	b. jerboa.	c. dolphin.	and the second s	
	3. When a car moves up	a hill, this happen o	lue to the effect of		
	a. gravity force.		c. balance force.		y.
	4. From structural adapt	ations in water lily pl	ant is that it has		
	a. long root.		b. needle leaves.		
	c. tiny leaves.		d. wide leaves.		
	(B) Write scientific term	for each of the follo	owing :		
	A system that controls			of its parts.	
	1. A system that control	oun body runouon an		(	)
	2. A group of ants that is	s responsible for sen	ding smelly messag	ge when there is	
	a shortage of food.	•		(	)
3	(A) Dut (. <) or (V)				
	(A) Put (✓) or (X):  1. Wood is transparent	object that allow light	t to pass through it.	(	)
	Nood is transparent     Bats use their sense			ì	)
	<ol> <li>Bats use their serise</li> <li>The chemical energy</li> </ol>			ctrical energy. (	)
	4. The sandy-colored fu				,
	environment.	ii Oi Caracai Heips ici	oletia ili ule ollow il	(	)
					3
	(B) Cross out the odd w			1	١
	1. Nose – Throat – Trac			(	
	2. Penguin – Polar bear	r – Fennec fox – Arci	ис тох.	(	)
3	(A) Complete the follow	wing sentences :			
	1. If a truck moves in hi	gh speed so it has m	nore ene	rgy.	
	2. Among animals can l				
	3. The fishing cats hunt			energy, while bull	
	sharks use	camuoflage strateç	gy to hunt.		
	4. Humans, amphibians	and reptiles have	to breathe	e oxygen gas in ai	r.

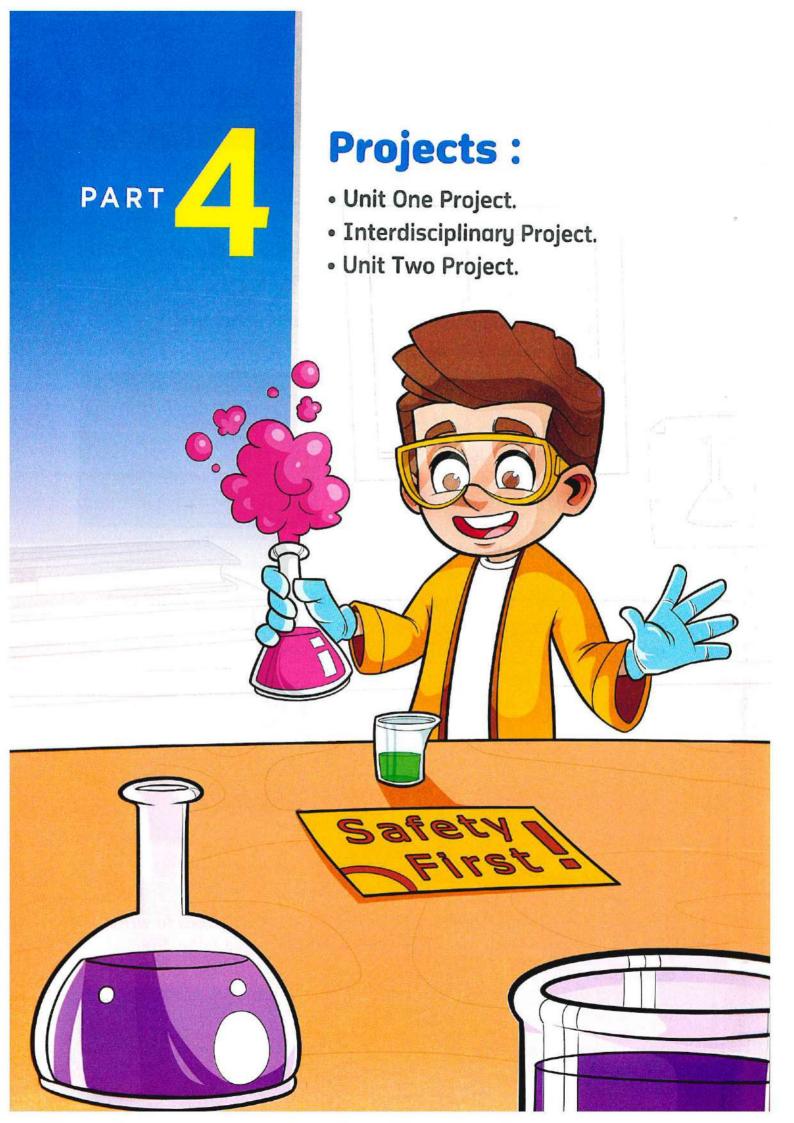
#### (B) From the following figure answer:



1. The position	has more kinetic energy.
2. The position	has more potential energy.

1. You see yourself in the mirror due to the property of	<b>15</b> Sou	ıth Sinai C	Governorate \	Science Inspectora	te	
a. light analysis. b. absorption. c. reflection. d. density.  2. As the inclination angle of the ramp increases, the speed of the moving body  a. decreases. b. increases. c. doesn't change. d. equals zero.  3	1 (A) Choose	the correct	answer :			
a. light analysis. b. absorption. c. reflection. d. density.  2. As the inclination angle of the ramp increases, the speed of the moving body  a. decreases. b. increases. c. doesn't change. d. equals zero.  3	1. You see	yourself in th	ne mirror due to the	property of		
a. decreases. c. doesn't change. d. equals zero.  equals zero.  d. equals zero.  e					isity.	
c. doesn't change.  d. equals zero.  d. Living in burrows c. Large eye d. Countershading  direction. a. right b. left c. forward d. backward  direction. a. right b. left c. forward d. backward  direction. a. right c. forward d. backward  direction. a. right c. forward d. backward  d. backward  c. forward d. backward  d. backward  d. backward  d. backward  energies the night vision in human differ from that in cats?  c. forward d. backward  d. backward  energies from that in cats?			gle of the ramp incre	eases, the speed of the movi	ng body	<b>y</b>
3	a. decrea	ses.		b. increases.		
a. Long ear  c. Large eye  d. Countershading  4. When a moving car is stopped suddenly, the passenger body will move in the direction.  a. right  b. left  c. forward  d. backward  (B) Why does the night vision in human differ from that in cats?  (A) Put (✓) or (✗):  1. During collisions the sum of energies before collisions are less than the sum of energies after collisions.  (A) You feel the heat of the stove by the sense of touch.  3. Stomach is an important organ in the digestive system.	c. doesn't	change.		d. equals zero.		
a. Long ear  c. Large eye  d. Countershading  4. When a moving car is stopped suddenly, the passenger body will move in the direction.  a. right  b. left  c. forward  d. backward  (B) Why does the night vision in human differ from that in cats?  (A) Put (✓) or (✗):  1. During collisions the sum of energies before collisions are less than the sum of energies after collisions.  (A) You feel the heat of the stove by the sense of touch.  3. Stomach is an important organ in the digestive system.	3	. is consider	red a behavioral ad	aptation in the living organisr	ns.	
4. When a moving car is stopped suddenly, the passenger body will move in the direction.  a. right  b. left  c. forward  d. backward  (B) Why does the night vision in human differ from that in cats?  (A) Put (()) or (X):  1. During collisions the sum of energies before collisions are less than the sum of energies after collisions.  ( )  2. You feel the heat of the stove by the sense of touch.  3. Stomach is an important organ in the digestive system.						
a. right b. left c. forward d. backward  (B) Why does the night vision in human differ from that in cats?  (A) Put (✓) or (✗):  1. During collisions the sum of energies before collisions are less than the sum of energies after collisions.  ( )  2. You feel the heat of the stove by the sense of touch.  3. Stomach is an important organ in the digestive system.	c. Large e	eye		d. Countershading		
(B) Why does the night vision in human differ from that in cats?  (A) Put ((/) or (x):  1. During collisions the sum of energies before collisions are less than the sum of energies after collisions.  ( )  2. You feel the heat of the stove by the sense of touch.  3. Stomach is an important organ in the digestive system.	4. When a n	noving car is direction.	stopped suddenly,	the passenger body will move	/e in the	Э
2 (A) Put (V) or (X):  1. During collisions the sum of energies before collisions are less than the sum of energies after collisions.  2. You feel the heat of the stove by the sense of touch.  3. Stomach is an important organ in the digestive system.	a. right		b. left	c. forward d. bac	kward	
<ol> <li>During collisions the sum of energies before collisions are less than the sum of energies after collisions.</li> <li>You feel the heat of the stove by the sense of touch.</li> <li>Stomach is an important organ in the digestive system.</li> </ol>	(B) Why doe	s the night v	vision in human dif	fer from that in cats ?		****
of energies after collisions. ( )  2. You feel the heat of the stove by the sense of touch. ( )  3. Stomach is an important organ in the digestive system. ( )	2 (A) Put (V)	or (x):				
2. You feel the heat of the stove by the sense of touch.  3. Stomach is an important organ in the digestive system.  ( )	During col     of energie	lisions the s	um of energies befo	ore collisions are less than th	e sum	120
3. Stomach is an important organ in the digestive system.				o of touch	(	)
					(	)
4. Potential energy is the distance traveled in the certain amount of time.					(	)

Charas from colu	nn (B) what suits it in column (A) :
(A)	(B)
1. Brain	a. it is a force arises between two contact surface
2. Smell	b. it is a force which pulls objects to downward.
3. Friction	c. the main control center of the body.
4. Gravity	<ul><li>d. the communication way between ants.</li><li>e. it is an automatic response for external stimuli.</li></ul>



## UNIT ONE Project

#### **Bat Chat**

In this project, you will make a research about bats to learn how their adaptations help them to navigate, hunt and communicate.

- ▶ Read the following paragraph to learn some facts about bats.
  - Bats live in dark places such as caves, where there is not enough light for them to see.
  - Bats fly very fast, so they need to be able to avoid hitting different objects during their flying.
  - Bats use sound to move around in the dark and also to hunt. To do this, they make a noise in their throats that is very high-pitched, so humans cannot hear it.



Bat

- When this noise hits the objects around, it bounces back to the bats' ears, that allows bats detect where these objects are, so they can avoid hitting these objects while flying, and this process is known as "echolocation".
- In the same way, bats use echolocation property to hunt their preys even if they are tiny as mosquitoes.
- Bats also use sound to communicate with each other, as they make different sounds that mean different things.
- Scientists have discovered that most of sounds that bats produce are arguments about food or where to get sleep.



Use the previous paragraph, other printed or online sources to write your claim, evidence and scientific explanation for the following question:

Let your child read the paragraph about bats and help him/her to search for more information about them in other printed sources or online sources.

communicate ?	use different sounds to navigate, hunt and
My Claim ———	
My Evidence —	
My Scientific Explana	ition —
Lico the word book below	
Word bank : Prey – Ba	at – Echo waves bounce back to the bat – bund waves produced from the bat
	3

<sup>•</sup> Let your child complete the previous steps and the diagram to make a research about bats and share it with his/her friends.

## INTERDISCIPLINARY Project

## To Get to the Other Side "The Sinai Blue Agama Lizard"

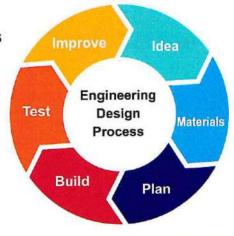
- ▶ The Sinai agama is a lizard that can be found in the dry and rocky environments of Eastern Egypt. In order to survive in this hot environment, this little reptile has some adaptations such as:
  - Standing on the top parts of its toes, so that its belly stays high above the hot rocks.



Sinai blue agama lizard

- · It has a scaly skin (scales) that traps in water.
- · It has a long, thin body that helps it climb and run quickly.
- Agama lizards save energy as they wait in the shaded areas between the rocks for their preys to come by so that they can attack them. They feed on ants, grasshoppers, beetles and other insects.
- The number of Sinai agama lizards decreases as they are negatively affected by human activities such as:
  - Catching them to be sold as pets.
  - Changing their natural habitat by building roads and sidewalks for people in these areas.
- ▶ In this project, use the steps of the Engineering Design Process that you have learnt in the previous educational grades to create a sidewalk design that meets the needs of humans without negatively affecting the habitat of Sinai agama lizards.





Let your child find out a solution to an environmental problem through designing a sidewalk for people without affecting the wildlife.

#### Idea

Create a sidewalk design that meets the needs of both humans and Sinai agama lizards using natural materials such as sand, rocks, wood and clay.

# You may use the following materials to build up your design: Carton sheets Small wooden sticks Paper sheets Small rocks Sand Wax gun

<sup>•</sup> In this project help your child to use the steps of the Engineering Design Process, which are : idea, materials, plan, build, test and improve.

#### Build

Draw your sidewalk design.



Example of a sidewalk design

	 		_
m		W	Р
		•	•

Write down your ideas to improve your sidewalk design.

# unit two Project

## **Vehicle Safety**

- Read the following paragraph to learn some information about safety features in cars.
  - Carmakers design vehicles for safety. The most common safety features in cars include seatbelts, airbags and headrests. Carmakers use new technologies to design new ways to keep drivers and passengers safe.
  - When passengers travel in a car and it suddenly stops, the forward force of the car's motion continues to act on the passengers.
     Most of time, the seatbelts are used to hold the driver or the passengers in their places so that they do not hit the steering wheel, dashboard, front windshield of the car or any hard objects inside the car.
- Sometimes, the seatbelts are not enough to protect the passengers, so airbags have been added to many cars in the front of cars and also in the side doors. These airbags are folded up inside the frame of the car and they work in the case of collisions or during sudden stop of the car.





Use printed or online sources to make a report about one of the new devices that are considered as safety features in cars (other than seatbelts and airbags) such as :

- Break assist.

- Collision warning
- Blind spot warning system.
- Tire pressure monitoring system.

#### Your report should describe :

- The name of the device you will choose.
- How your device works during collisions or dangers.
- Which passengers would benefit from your device (e.g. the driver, the front passenger or the back passengers).
- The methods you can use to test your device.
- How can you improve your device.

Let your child create a report about one of the new safety devices in cars using different sources and also explain how does it work, how to test it and how to improve it.

and the state of t		en dance by Complete
How my devic	e works :	
	gers would ben	
		; ; ;
	et my douice :	
Methods to to	est my device :	
Methods to to	est my device :	
Methods to to	est my device :	
Methods to to		
Methods to to		



# SCIENCE

**Guide Answers** 

By A Group of Supervisors



Part 1

Guide Answers of Exercises on Lessons (Page 3)

Part 2

Guide Answers of Self-Assessments

(Page 30)

PART

Part 3

Guide Answers of
Final Examinations (Page 41)



Guide Answers of

Exercises on Lessons



# Concept (1.1)

# Exercises on Lesson 1

- 1 1.d 2.d 3.b 4.d 5 a 6.c 7.b 8.b 9.d 10.b 11.b 12.d
- 3 1. (x) 2. (√) 3. (√) 4. (x) 5. (√) 6. (x) 7. (x)
- 4 1. habitat.
  - 2. predator prey
  - 3. adaptation.
  - 4. camouflage.
- 1. Adaptation.
  - 2. Penguin.
  - 3. Thick white fur.
  - 4. Fennec fox.
  - 5. Camouflage.
- 6 1. fat feathers.
  - 2. blood vessels
  - 3. black brown white
  - 4. fennec fox caracal
  - starred agama fennec
  - 6. warm white
  - 7. colorful scales
  - 8. penguin polar bear.
  - 9. predators camouflage

- To keep its body cool during hot sunny days.
  - 2. To keep its body warm.
  - To keep its toes from freezing as the warm blood vessels heat up the cold blood vessels.
  - To hide among the colorful rocks in the desert.
  - Fennec fox has a sandy-colored fur to blend in with desert landscapes, while polar bear has a white fur to blend in with snow in polar region.
  - Because camouflage helps some animals hide from their predators or preys in different environments.
- The blood moving up into the penguin's body will be cold which may make it freeze.
  - It cannot adapt with the very cold weather in polar regions.
  - It cannot hide and hunt its preys in the desert environment.
  - They cannot hide from their predators or preys in their environments.

# 9 1.

P.O.C.	Penguin	Fennec fox
1. Habitat :	Polar habitat.	Desert habitat.
2. Body is covered with :	Dense feathers.	Sandy- colored fur.

2

P.O.C.	Polar bear	Forest bear
1. Habitat :	Polar habitat.	Forest habitat.
2. Fur color :	White.	Dark (brown or black).

- 10 b and d
- 11 1. desert
  - 2. sandy camouflage.

# Exercises on Lesson 2 Part A

- 1 1.c 2.a 3.b 4.b 5.a 6.c 7.c 8.a
  - 9. d 10. d 11. a 12. b
  - 13. a 14. a 15. b
- 2 1. b → C
  - 2. d -- A
  - 3. a → B
  - 4. c D
- 3 1. (√) 2. (x) 3. (x) 4. (x)
  - 5. (1) 6. (1) 7. (1) 8. (1)
  - 9. (V) 10. (X) 11. (X) 12. (V)
- 13. (V) 14. (X) 15. (X)

# 4

Animal	Its adaptation	Structural or Behavioral adaptation
1. Penguin	Has blood vessels weave around each other.	Structural.
2. Polar bear	Has thick white fur.	Structural.
3. Arctic fox	Changes the color of its fur.	Structural.
4. Fennec inside burrows to stay cool.		Behavioral.
5. Panther chameleon	Has eyes face opposite directions.	Structural.

- 1. reptiles
  - 2. countershading.
  - 3. tundra
  - 4. panting
- 6 1. Structural adaptation.
  - 2. Behavioral adaptation.
  - 3, Fennec fox. 4. Panting.
  - 5. Arctic fox.
  - 6. Panther chameleon.
  - 7. V-shaped feet.
  - 8. Countershading.

- 1 structural behavioral
  - 2. structural behavioral
  - 3. fenneo arctic
  - 4. fennec arctic
  - 5. structural behavioral
  - 6. arctic fennec
  - 7. white brown
  - 8. fresh salt
  - 9. structural
  - 10. structural
  - 11. behavioral structural
- To hide in a sandy, rocky environment and to protect it from the hot Sun.
  - 2. To cool its body.
  - To keep its body warm in extreme cold climate.
  - To help it sneak up on prey in any season.
  - 5. Because burrows help :
    - Fennec fox to stay cool during the sunny day.
    - Arctic fox to stay warm at night.
  - Because extra-large ears help the fennec fox to lose the heat to cool its body, while short ears help the arctic fox to stay warm.

- Because other types of sharks live in salt water only.
- To hold tightly the branches of trees.
- Because it is a change in the body structure of living organism to help it survive.
- 1. It cannot hide from its prey in winter or summer.
  - 2. It cannot cool its body.
  - 3. They cannot hunt easily.
  - It cannot sneak up on prey in summer season.
  - The panther chameleon cannot hunt its prey and avoid becoming a prey at the same time.
  - It puffs up its body with air, opens its mouth wide and changes the color of its scales.
- 10 1. Fennec fox. (all items live in cold regions, while fennec fox lives in hot regions).
  - Bull shark. (all items live on land, while bull shark lives in water).
  - Panther chameleon. (all items have fur on their bodies, while panther chameleon has scales on its body).

# 11

P.O.C.	Fennec fox	Arctic fox
1. Habitat :	Hot desert.	Cold desert.
2. Color of fur :	Tan-colored.	White during winter & brown in summer.
3. Shape of ears:	Extra-large.	Short.
4. Time of entrance to burrows :	During the sunny days.	At night.

- 12 1. S 2. B 3. S 4. S 5. S 6. B
- 1. It pants like dogs to cool its body.
  - It searches for a shaded area during a hot sunny day to cool its body.
  - It hunts during the day and at night, so it can surprise its prey.
  - It puffs up its body with air during danger.
- 1. Arctic fox It lives in tundra desert.
  - 2. winter summer
  - To sneak up on prey in any season.

- Structural adaptation: it has short ears and legs to help it stays warm.
  - Behavioral adaptation : it lives in burrows to stay warm at night.

# Exercises on Lesson 2 Part B

- 1 1.0 2 d 3. d 4 c 5. c 6. c 7 b 8. c 9. b 10. d 11. c 12. b 13. d 14. c 15. b 16. c 17. d 18. b 19. b 20. a
- 2 1, b 2.e 3, f 4, a 5, d
- 3 1. (x) 2. (√) 3. (√) 4. (x) 5. (√) 6. (x) 7. (x) 8. (√)
  - 9. (x) 10. (v) 11. (v) 12. (x)
  - 13. (x) 14. (v) 15. (v) 16. (x)
- 4 1. Acacia tree.
  - 2. Taproot.
  - 3. Sharp spines.
  - 4. Kapok tree.
  - 5. Buttress roots.
  - 6. Trunk.
  - 7. Mangrove tree.
  - 8. Water lily plant.
  - 9. Wide leaves.
  - 10. Needle leaves.
  - 11. Botanist.
- 5 1. a poison body
  - 2. soggy
- 3. wind
- 4. bats

- acacia tree Palm tree barbary fig plant.
- 6. acacla pine
- 7. float sunlight.
- 8. water roots.
- 9. mangrove palm
- 10. water lily kapok
- To prevent animals from reaching its leaves to feed on.
  - To prevent animals from eating its leaves.
  - Because acacia tree uses wind to send smelly message to acacia trees nearby telling them to start making a poison.
  - To allow wind to move more gently through the leaves without cutting them.
  - Due to presence of large and wide buttress roots.
  - To allow the snow slide easily over it, so its branches don't break.
  - To absorb a large amount of sunlight.
  - 8. To resist the water waves.
  - 9. To resist the strong winds.
  - To prevent animals from eating its fruits and leaves.
- It can't search for water in the deep soil.
  - Animals can eat these leaves easily.

- Kapok tree can't stay firmly in soggy soil.
- The snow can't slide easily over its branches and the branches break down more easily.
- The sunlight can't reach these plants easily.
- It can't absorb a large amount of sunlight.
- 7. It can't resist the strong winds.
- Buttress roots. (all items belong to acacia tree, while buttress roots belong to kapok tree).
  - Taproot. (all items belong to kapok tree, while taproot belongs to acacia tree).
  - Polar bear. (all items live in desert habitat, while polar bear lives in polar region habitat).
  - Acacia tree. (all items live in snow habitat, while acacia tree lives in savannah habitat).

9 1.

P.O.C.	Acacia tree	Kapok tree
1. Type of roots :	Very long (taproot).	large and wide (buttress roots).
2. Shape of leaves :	Tiny leaves.	Hand- shaped leaves.

2.

P.O.C.	Kapok tree	Water lify plant	Pine tree
1. Habitat:	Rainforest	Wetland	Snow
2. Shape of leaves :	Hand- shaped leaves	Wide leaves	Needle

10

Organisms live in deserts	Organisms live in forests
- Starred agama	
lizard.	- Panther
- Fennec fox.	chameleon,
- Palm tree.	- Kapok tree.
- Barbary fig plant.	

- 11 1. desert
  - 2. spines tough
  - 3. animals leaves.

- 1 1. d 2. b 3. c 4 c 5. d 6. d 7. d 8. a 9. c 10. b 11. d 12. d 13. b 14. d 15. c 16. b 17. a 18. b 19. d 20. b
  - 21. d 22. c 23. d 24. b
- 2 1.1.e 2.d 3.a 4.b 5.c 2.1.d 2.c 3.a 4.b
- 3 1. (x) 2. (x) 3. (x) 4. (x) 5. (x) 6. (x) 7. (x) 8. (x)

- 9. (\*) 10. (\*) 11. (\*) 12. (\*)
- 13. (✓) 14. (×) 15. (×) 16. (✓) 17. (×)
- 1. Digestive system.
  - 2. System.
  - Digestion process.
  - Mouth.Teeth.
  - 6. Saliva. 7. Stomach.
  - 8. Small intestine
  - 9. Anus. 10. Esophagus.
  - 11. Respiration process.
  - 12. Throat. 13. Trachea.
  - 14. Alveoli. 15. Diaphragm.
  - 16. Throat.
- 5 1. digestive respiratory
  - 2. teeth tongue
  - 3. stomach small intestine.
  - 4. esophagus small intestine
  - 5. small intestine
  - 6. liver pancreas
  - 7. blood vessels.
  - 8. small large
  - 9. respiratory
  - 10. bronchioles alveoli.
  - 11. trachea.
  - 12. diaphragm.
  - 13. downward upward.
- 6 1. To perform different functions.
  - Because they help in breaking down food into nutrients.
  - Because solid waste materials leave the body through it.

- 4. Because the tribated air is, not in coppen gas, while the exhaled air is not in carbon dioxide gas.
- 5. Because it contracts and evoyes downward during exhalation to increase the size of chest, while it relaxes and moves upward during exhalation to decrease the size of chest.
- The digestive system could not do its function correctly.
  - The blood carries these nutrients to all the body parts.
  - The size of chest increases, the air rich in oxygen gas enters the lungs.
  - The size of chest decreases, the air rich in carbon dioxide gas comes out of the lungs.
- 1. Sialive (all tierre are organs through which food passes in the digestive system, while salive is a liquid substance in results that helps in digestion of food).
  - Lungs, (all terms belong to the digentive system, while lungs belong to the respiratory autem).
  - Arture (all terms belong to the respiratory system, while erus belongs to the digostive system;

Organ (1): Esophagus.
Organ (2): Simall intestine.
Organ (3): Large intestine.
Organ (4): Trachea.

# 10

PO.C.	Inhalation	Exhalation
Disphragm movement :	Downwards.	Upwards.
Size of chest cavity;	Increases.	Décreases.
3. The air is rich in :	Oxygen gas.	Carbon diceide gas.

### **I**

The organ	The	The system	system
Tree or gans	Digestive	Respiratory	
1. Traches		1	
2. Aress	1		
3. Stomach	1		
4 Longs		1	
6. Small intestine	1		
6. Exophagus	1		
7. Disphragm		1	
8 Nose		1	
5. Large Intestine	1		
10 Liver	1		
11. Parscreas	1		
12. Throat	1	1	

- 1. Mouth saliva
  - 2. Esophagus stomach.
  - 3. Stomach stomach digestive
  - Small intestine pancreas –
    liver nutrients.
  - Large intestine water undigested
  - 6. Anus waste.
- 15 1 Nose.
- (2) Throat.
- 3 Trachea.
- 4 Two bronchi.
- (5) Bronchioles. (
- 6 Alveoli.
- (7) Two lungs.
- (8) Diaphragm.

### Exercises on Lesson (4)

- 1 1.c 2.d 3.c 4.b 5.b 6.d 7.d 8.d
  - 9. a 10. c
- 21.(x) 2.(x) 3.(x) 4.(\sqrt)
  - 5. (x) 6. (x) 7. (v) 8. (v)
  - 9. (V) 10. (X) 11. (V) 12. (V)
- 3 1. oxygen gas 2. Water
  - 3. oxygen gas
  - 4. structural adaptation
  - 5. animals, plants and humans
  - 6. Air pollution
- 4 1. Gilla.
  - 2. Oxygen gas.
  - 3. Carbon dioxide gas.
  - 4. Water pollution.
  - 5. Air pollution.

- 1: lungs gills 2. blood
  - 3. structural
  - 4. air water 5. plants
  - 6 smog.
  - 7. damage of lungs asthma
- Because they enable fish to extract oxygen gas from water for respiration.
  - Because they produce smog which causes damage of lungs, asthma and heart diseases.
  - 3. To decrease air pollution.
- The pollution of air, water and soil will increase.
  - Smog increases causing breathing problems as damage of lungs, asthma and heart diseases.
  - Humans cannot get clean water to drink and fish cannot get clean water to breathe.
- 8 1.0
- 2.0
- 9 1. gills
  - 2. oxygen
  - carbon dioxide
  - 4. structural

- 11 b 2 c 3 a 4 d 5 d 6 b 7 a 8 d
  - 9.0 10.0

### PART 1

- 2 1. (✓) 2. (**x**) 3. (**x**) 4. (✓) 5. (**x**) 6. (✓) 7. (✓) 8. (✓) 9. (✓)
- 1. Amphibians. 2. Skin.
  - 3. Amphibians.
  - 4. Structural adaptation.
  - 5. Lungs.
- 1. reptile amphibian.
  - 2. lungs
  - 3. gills lungs skin.
  - 4. gills
- decreases.
- 6. lungs skin. 7. structural
- 8. carbon dioxide gas
- 9. air water
- 5 1. water. 2. wet
  - 3. an amphibian. 4. lungs
  - 5. oxygen gas 6. amphibians.
  - 7. Amphibians 8. air.
- Because skin of frog can absorb oxygen gas directly from water, while fish cannot.
  - Because their skin must be wet all the time, to be able to get oxygen gas directly from water.
  - Because they breathe in oxygen gas from water and air.
  - 4. To help them survive.
- The number of amphibians will decrease.

- Amphibians will survive and their numbers increase.
- 3. They can live only under water.
- The number of amphibians will decrease.
- Salamanders can live on land only.
- They will respire by using lungs only and can't breathe through their skin, so they can't live under water.

### Model Exam (1) on Concept (1.1)

- 1 (A) 1. d 2. b 3. b 4. a
  - (B) Because they enable fish to extract oxygen gas from water for respiration.
- 2 (A) 1. (★) 2. (★) 3. (★) 4. (✓)
  - (B) The size of chest decreases, the air rich in carbon dioxide gas comes out of the lungs.
- 3 (A) 1. wet
  - 2. Amphibians
  - 3. oxygen gas
  - 4. Water lily plant
  - (B) It hunts in different places like salt water or fresh water.

### Model Exam (2) on Concept (1.1)

- (A) 1. Thick white fur.
  - 2. Countershading.
  - 3. Mangrove tree.
  - 4. Anus.

- (B) 1. Acacia tree. (all items live in snow habitat, while acacia tree lives in savannah habitat).
  - Bull shark. (all items live on land, while bull shark lives in water).
- 2 (A) 1. b 2. c 3. b 4.a
  - (B) 1. structural 2. Esophagus
- 3 (A) 1. a 2. b 3. diaphragm – increases 4 carbon dioxide
  - (B) To perform different functions.

# Concept (1.2)

### Exercises on Lesson 1

- 1 1. d 2. d 3. c 4. b 5. d 6. a 7. d
- 2 1. (x) 2. (\sqrt{)} 3. (\sqrt{)} 4. (x) 5. (x) 6. (\sqrt{)} 7. (x) 8. (x)
- 3 1. Echolocation. 2. Eye.
  - 3. Nose.
- 4. Touch.
- 5. Echo.
- 4 1. smell hearing
  - 2. hearing.
  - 3. hearing echolocation
  - 4. smell
  - 5. sound

- 5 1. hearing.
- 2. nose
- 3. eves
- 4. echolocation
- To communicate with other mongooses to move from one place to another or when searching for food.
  - Because owls have extraordinary senses of hearing and sight that make them able to find their preys in the dark.
  - Because dogs have very sharp senses of hearing and smell.
  - Because dolphins have super sense of hearing, so they can hear all kinds of sound.
- 7 The sound waves bounce back to the dolphin in the form of echo so, the dolphin can detect the location of this object.
- (2) The sound waves travel and hit the prey .....
  - (3) The echo helps the dolphin .....
  - (1) The sound produced by a dolphin .....
- 9 1.b 2.d 3.a 4.c

- 11.d 2.c 3.a 4.d 5.b 6.a 7.d 8.c
  - 5.b 6.a 7.d 8.c 9.d 10.d 11.d 12.d
  - 13. d 14. a 15. d 16. b
  - 17. c

- 2 (1) 1. d 2. a 3. b
  - (2) 1. d 2.e 3.a 4.c
- 3 1. (x) 2. (x) 3. (\(\sigma\) 4. (x)
  - 5. (V) 6. (X) 7. (V) 8. (X)
  - 9. (V) 10. (X) 11. (X) 12. (X)
  - 13. (V) 14. (X) 15. (V)
- 4 1. Noctumal animals.
  - 2 Jerboa.
- 3. Echolocation.
- 4. Owl.
- 5. Nervous system.
- 6. Brain.
- 7. Spinal cord
- B. Sense organs.
- 9. Sensory receptors.
- 10. Reaction time.
- 1. dolphins bats.
  - 2. spinal cord.
  - 3. behavioral
  - 4. hearing sight.
  - 5. head eyes
  - 6. structural
  - 7. eyes brain
  - 8. hearing ears.
  - hind legs catch sand when it jumps,
  - 10. ears brain.
  - 11 reaction time.
- 6 1 nervous
- 2. structural
- 3. backbone.
- 4. brain,
- 5, hair.
- 6. strogner 8. tasting
- 7. quickly.
- 9. echolocation.

- Because the weather becomes cool at night in these regions.
  - To direct distant sounds into the owl's ears.
  - Because they depend on echolocation to find insects at night.
  - Because it becomes active at night.
  - Because it has long hind legs that make it jump for long distances.
  - To help it grip the sand when it jumps.
  - Because it has large and sensitive ears, so it can detect even a quiet snake.
- 8 1. They cannot hunt at night.
  - They cannot search for preys everywhere, but in one direction only.
  - The hand will move quickly away in less than one second.
  - It hops in zigzag patterns, so it can escape quickly from danger.
- 9 (4) The brain alerts the jerboa's legs .....
  - (3) The brain processes ......
  - (1) A jerboa hears a .....
  - (5) The jerboa jumps .....
  - (2) The sensory receptors that found ......

- 10 a. The nervous system.
  - b. 1 Brain.
- 2 Spinal cord.
- 3 Nerves.
- c. 1. (2)
- 2. 1
- 3. (2)

3. (3)

- 1 1. nocturnal
- 2. 1
- 4. echolocation. 5. Dolphin.
- 6. structural

# Exercises on Lesson 3

- 1 1. d 2. a 3. b 4. c 5. a 6. d 7.c 8. b
- 2 1. (\(\sigma\) 2. (\(\sigma\) 3. (\(\sigma\) 4. (\(\sigma\)\) 5. (\(\mathbf{x}\)) 6. (\(\mathbf{x}\)) 7. (\(\sigma\))
- 3 1. Nerves.
  - 2. Sensory organs.
  - 3. Ear.
  - 4. Brain.
  - 5. Reflexes.
- 4 1. nose
  - 2. nerves backbone
  - 3. brain
- 4. reflex.
- 5. sensory receptors brain.
- 6. ear nose
- 7. ears brain
- 8. hearing.
- 5 1. sensory receptors.
  - 2. hearing.
- 3. brain
- Eyes. (all items are senses, while eyes are sense organs).
  - Taste. (all items are sense organs, while taste is a sense).
  - Lungs. (all items belong to the nervous system, while

lungs belong to the respiratory system).

- 7 1. Because ears receive the different sounds and send them through nerves to the brain to be processed, so brain can determine the type of musical instrument.
  - Because it is the main control center of the body.
- Messages cannot be transmitted between brain and body parts.
  - Brain cannot process what is seen by the eyes.
- 9 1. nervous
  - 2.2-3-1
- 10 1. 1, 5 2. 3, 6 3. 2, 4
- 11 1. The main control center of the body.
  - 2. The nerves
  - It carries messages from the brain to the body parts and vice versa.

- 1 1. b 2. c 3. d 4. a 5. c 6. d 7. d 8. a
  - 9. a 10. d 11. d 12. c
- 2 1.d 2.c 3.b

- 2. (x) 3. (V) 4. (X) 8. (x) 6. (x) 7. (V) 5 (x) 9. (V) 10. (V) 11. (X)
- 2 Soldier 1 different 4. summer. 3 different 5. High
  - 1 Winter. 4. Nurse ants. 3 Ants. 5. High-pitched sounds. 6. Low-pitched sounds.

8. Nose.

2. Summer.

9. Bat.

- 10. The special cane of blind people.
- 6 1. echolocation 2. smelly 3. smell
  - 4. nurse scout soldier 5. hearing - notes (tones) songs.
  - 6. high cold
  - 7. summer low
  - 8. sound light
  - 9. acacia

7 Fars

- 10. vibrations
- 7 1. To alert the scout ants that the food is low.
  - 2. To communicate with the other ants in case of danger.
  - 3. Because high-pitched sounds travel better through cold water.
  - 4. To communicate with each other in different seasons.
  - 5. To tell the blind person where objects are around him.

- 6. Because their special canes emit a high-pitched sound that human's ears cannot hear it
- They cannot communicate with each other by smelly messages.
  - 2. The nurse ants send smelly messages to scout ants to alert them to find the food
  - 3. The solider ants send smelly messages to alert the other ants that there is a danger nearby.
  - 4. It bounces back to the cane in the form of echo which is turned into vibrations
  - 5. They cannot locate the objects by the sense of hearing or hunt its preys at night.
  - 6. The cane will make vibration that tell the blind person that there is a wall in front of him.
  - 7. They cannot communicate with each other by songs using their hearing sense.

### Model Exam (1) on Concept (1.2)

- 1 (A) 1. a 2. a 3. d 4. c
  - (B) To help it jump long distances.
- 2 (A) 1. ears 2. brain 3. hearing. 4. weaker
  - (B) They cannot search for preys everywhere, but in one direction only.

(A) 1. Bats. 2. Summer. 3. Nose 4. Reflexes (B)

Device	Inspired from the adaptation of
Blind people cane.	Bats.

# Model Exam (2) on Concept (1.2)

- (A) 1. Reaction time.
  - 2. Taste.
  - 3. Nervous system.
  - 4. Brain
  - (B) 1. Nerves.
    - 2. Spinal cord.
    - 3. Brain.
- 2 (A) 1. nose 2. smell
  - 3. behavioral.
  - 4. hearing sight.
  - (B) (4) The brain sends a signal .....
    - (1) Hearing the whistle .....
    - (3) The brain processes .....
    - (2) The nerves of the ears .....
- 3 (A) 1. (★) 2. (★) 3. (✔) 4. (★)
  - (B) The nurse ants send smelly messages to scout ants to alert them to find the food.

# Concept (1.3)

### Exercises on Lesson (1)

2. b 3. b 4. b 5. c 6. d 7. c 8. b

- 9. d 10. d 11. b 12 h 13. a 14 d 15. c 16. d 17. c
- 2 1. (√) 2. (√) 3. (√) 4. (√) 5. (x) 6. (x) 7. (\sqrt) 8. (\sqrt) 9. (x) 10. (\sqrt) 11. (\sqrt) 12. (\sqrt)
- 3 1. more light 2. mirror-like membrane
  - 3. source of light. 4. bounce off
- 4 1. Eye. 2. Fishing cats.
  - 3. Sources of light.
  - 4. Brain. 5. The moon.
  - 6. Night vision goggles.
  - 7. Mirror-like membrane
  - 8. Light.
- 1. different 2. light energy.
  - 3. Sun
  - 4. nervous system.
  - 5. back
  - 6. Light 7. brain 8. black
- 6 1. sight. 2. light
  - 3. structural
  - 4. smaller wider
  - 5, hearing smelling.
  - 6. light nocturnal
  - 7. reflect
  - 8. candles the moon mirror
- 1. Because it has a mirror-like membrane at the back of its eyes which bounces off the light.

# cast 1

- Because 8 gives off 8s own. light.
- Because the eye pupil of necturnal animals open wider than the eye pupil of human to allow more light enter the eyes of necturnal animals.
- Because light rays fall on objects then reflect off these objects into our eyes causing vision.
- Because the moon reflects the sunlight.
- If doesin't have excellent night vision so cannot hunt at night.
  - if seems to be dark and we can't see it.
- The moon (all items are sources of light, while the moon is reflecting the sunlight).
  - Candle (all liems are reflecting the light, white candle is a source of light).
- 10 1 (x) 2 (v) 3 (v)

# Exercises on Lesson 2

- 11.c 2d 3b 4d 5.c 6d 7.b 8d 9.c 10.c
- 21.0 2.0 3.8 4.a
- 1 (x) 2 (x) 3 (x) 4 (v) 8 (v)
- 1. Transparent materials.
   2. Opaque materials.

- 3. Rough surface.
- 4. Smooth surface.
- 1 reflection
- 2. Transparent
- 3. Smaoth
- T, straight
- 2, waves
- opaque transparent,
- A. reparate light
- 5. rough light
- 6. metal opaque don't allow
- 7. one angle
- 8. transparent glass sir.
- Decause the opaque tody doesn't allow light to pass through.
  - Because the glass cup is a transparent material which allows light to pass through.
  - Because the mirror is more smooth then the painted surface.
- The shadow of the woold sheet is formed on the wall, because light rays carnot pass through it.
  - Light passes through the glass window.
  - Light rays are reflected in different directions.
- (3) Special nerves in the eyen
  - (2) The reflected light travels
  - (4) The brain interprets .
  - (1) Light rays bounce off .....

- 1. a. smooth and shory surface.
  - The light race are reflected at the some angle at woon they some the object.
  - 5. Hough surface.
    - See light rays are reflected in different directions.
  - d attraight
  - 20

### m

Sexualit remarkets.	Strough maderiotis
- Minner	- Closes
- Selected.	- Stood
	- Planer

### 12

Оринули опристе	Franspalant plajects
- Wheel.	- Ay
- Metat	- Wilder
	- Lersea.

- III 1. gitess
- 2. reflect
- Wood (all terms are transparent objects, while wood is opeque object).
  - Metal (all ferms are mugh multansis, white metal is shiny and smooth material).
- 15 1. opaque
  - 2. absorbed reflected.
  - 3. rough

# Exercises on Leasure (1

- 10 20 20 40
- 11 1 2 h 1 d
- DITO DIN BIN AIN
  - 1. sight 2. s mate
  - 3. Chemistal reaction.
  - 4. first's pattern.
  - 3. sight hearing.
  - A reading writing
  - 7 printesing essents depaying tight
- 1. No communication with made officer
  - To waint off from their predictors or to afficient a meta.
  - 3. To light up their facilies and communicate with each other
- \* produces a chemical reaction mode to body to light up and attract a mate.

### 7

Song	Ligne	Boorte	Sinth lights and around around
1. Car lamps.	1		
2. Television.			1
2. Traffic Sights.	1		
4. Radio.		1	

# Exercises on Lesson 4

- 11 1. d 2. d 3. b 4. c 5. b
- 2 1. b 2. c
- 3 1. (\(\sigma\) 2. (\(\mathbf{x}\) 3. (\(\sigma\) 4. (\(\mathbf{x}\)) 5. (\(\sigma\))
- 4 1. Code. 2. Writing. 3. Light house.
- 5 1. sound light 2. light 3. hearing 4. sight
- To give a specific meaning according to the arrangement of letters in a word.
  - To help people predict our feelings.
- 7 The eyes send a message through nerves to my brain to stop walking and not cross the road.
- **3** 1. (**x**) 2. (**√**) 3. (**√**) 4. (**√**) 5. (**x**)

# Model Exam (1) on Concept (1.3)

- 1 (A) 1. d 2. c 3. b 4. c
  - (B) Because the glass is a transparent material, which allows light to pass through.
- 2 (A) 1. (x) 2. (x) 3. (√) 4. (√)

- (B) Light rays will reflect in different directions.
- (A) 1. brain eyes
  - 2. sight hearing smelling
  - 3. nocturnal reflects
  - 4. rough light
  - (B) 1. The moon (all items are sources of light, while the moon reflects the sunlight).
    - Flashlight (all items reflect light, while flashlight is a source of light).

### Model Exam (2) on Concept (1.3)

- 1 (A) 1. b 2. d 3. b 4. c
  - (B) Because it has a mirror-like membrane at the back of its eyes which bounces off the light.
- 2 (A) 1. reflect
  - 2. one angle
  - 3. flash pattern
  - 4. sound light
  - (B) It doesn't have excellent night vision so cannot hunt at night.
- 3 (A) 1. ( $\checkmark$ ) 2. ( $\checkmark$ ) 3. (x) 4. (x)
  - (B) 1. Transparent materials.2. Eyes.

# Concept (2.1)

# Exercises on Lesson 1

- 1 1. a 2. b 3. a 4. c 5. d 6. b 7. d 8. a 9. a 10. c
- 2 1. (✓) 2. (x) 3. (✓) 4. (✓) 5. (x) 6. (x) 7. (✓) 8. (✓) 9. (x) 10. (x) 11. (✓) 12. (x)
- 3 1. Pulling force.
  - 2. Pushing force.
  - 3. The Shockwave truck
- 4 1. forces 2. push pull
  - 3. jet engines parachutes
  - 4. rocket.
  - 5. parachutes Shockwave
  - 6. leaves fire extinguishers
  - 7. speed
- 1. Because the Shockwave truck has three jet engines.
  - To help slow down the Shockwave truck quickly.
  - Due to the pushing force of your leg that acts on it.
- 6 1. It starts to move on the ground.
  - It turns into the Shockwave truck and moves with high speed.
  - The Shockwave truck starts to stop gradually.

7 1. (2) - (1) 2. (2) - (1)

3. (2)

- 8 1. It will move faster.
  - 2. 1. ( ) 2. ( \* )

- 1 1. c 2. a 3. d 4. b 5. b 6. b 7. c 8. b 9. c 10. d 11. a 12. d
- 2 1. (\(\sigma\) 2. (\(\mathbf{x}\) 3. (\(\mathbf{x}\)) 4. (\(\mathbf{x}\)) 5. (\(\sigma\)) 6. (\(\mathbf{x}\))
- 3 1. Force.
  - 2. Pushing force.
  - 3. Pulling force.
  - Motion.Gravity.
- 4 1. pulling pushing
  - 2. forces 3. pulling
  - 4. gravity. 5. pulling pulling
  - 6. pushing 7. motion.
  - 8. gravity.
  - 9. pushing pulling
  - 10. fixed
- 5 1. pushing 2. pulling 3. unbalanced 4. gravity 5. motion. 6. pull
- 1. Because the two forces are balanced, so the object doesn't move.

- Due to the pulling force of the gravity that pulls the pen down toward the Earth.
- Due to the pushing force of his hand against the ball movement that makes it stops.
- The rope will not move because the two forces are balanced.
  - It will fall down on the ground due to the pulling force of gravity.
- 8 1. Balanced. 2. Unbalanced.
- 9 1. Pushing force.
  - 2. Pulling force.
  - 3. Pulling force.
  - 4. Pushing force.
- 10 1. d 2. b

### Exercises on Lesson 3

- 1 1. a 2. b 3. d 4. c 5. d 6. d
- 2 1. (x) 2. (\sqrt{)} 3. (x) 4. (\sqrt{)} 5. (\sqrt{)} 6. (\sqrt{)} 7. (x) 8. (x)
- 3 1. opposite 2. decreases.
- 4 1. Friction. 2. Friction.
- 5 1. friction opposite
  2. force greater
  3. longer 4. greater

- 5. friction 6. long short 7. longer
- Because the wall applies

   a force to the car with the
   same amount of the force that
   pushes the car toward the
   wall.
  - Due to the friction force between the bicycle tires and the road that acts in the opposite direction of the bicycle movement.
  - Due to the difference in the forces that act on each of them.
  - Because the small object travels faster than the bigger object when the same amount of force acts on them.
- 1. Its speed decreases gradually until it stops.
  - The ball that is affected by the greater force will move a longer distance than the other ball.
- 8 1. Car (A), because it travels a longer distance than car (B).

# Exercises on Lesson 4

- 1 1.c 2.a 3.d 4.a
- 2 1. (\(\sqrt{}\) 2. (\(\pi\)) 3. (\(\pi\)) 4. (\(\pi\))
- 3 1. energy
  - 2. energy work
  - 3. energy 4. force

The second player, because he raises a weight heavier than the first player, so he needs larger amount of energy to do more work.

# Model Exam (1) on Concept (2.1)

- (A) 1. c 2. d 3. a 4. l
  - (B) The rope will not move, so there is no winner team.
- 2 (A) 1. (X) 2. (\sqrt) 3. (X) 4. (\sqrt)
  - (B) Due to the friction force between the pen and the table surface that acts in the opposite direction of the pen movement.
- 3 (A) 1. long 2. opposite 3. jet engines 4. balanced
  - (B) 1. parachute
    2. the Shockwave truck –
    rocket

### Model Exam (2) on Concept (2.1)

- 1 (A) 1. increase. 2. force 3. friction 4. force
  - (B) Due to the friction force between the ball and the flat road that acts in the opposite direction of ball movement.
- 2 (A) 1. Pulling force.
  - 2. Gravity force.
  - 3. Jet engine.
  - 4. Friction force.

- (B) The car travels a distance longer than the truck.
- (A) 1. b 2. d 3. a 4. c (B) 1. pushing 2. air

# Concept (2.2)

- 1 1. a 2. b 3. a 4. d 5. b 6. c 7. b 8. d 9. c 10. d
- 2 1.c 2.d 3.a
- 3 1. (✓) 2. (x) 3. (✓) 4. (x) 5. (x)
- 1. Kinetic energy.
  2. Kinetic energy.
- 5 1. increases. 2. pulling force 3. kinetic 4. pulling force 5. stay stopped. 6. kinetic
- 6 1. electric motor electricity.
  - 2. less 3. decreases.
  - 4. electrical kinetic
  - 5. kinetic
- Because its stored potential energy changes into kinetic energy, that helps it move downward.
  - Because its kinetic energy increases.
  - 3. Because the kinetic energy of the ball transfers to the goal net.

# PART 1

- Its stored potential energy changes into kinetic energy.
  - 2. It can't move, so it will stop.
  - Its stored potential energy changes into kinetic energy.
  - The object has potential energy.
- 9 1. b

10 1. kinetic

- 2. d
- 2. no 3. potential

4. C

3. c

# Exercises on Lesson 2

- 1 1.a 2.d 3.b 4.c 5.d 6.b 7.b
- 2 1.d 2.b 3.e
- 3 1. (x) 2. (\sqrt) 3. (\sqrt) 4. (\sqrt)
  - 5. (1) 6. (1) 7. (1)
- 4 1. Potential energy.
  - 2. Kinetic energy.
  - Energy. 4. Work.
  - 5. Potential energy.
- 5 1. work
- 2. light
- 3. kinetic
- 4. potential
- 6 1. energy.
- 2. work
- 3. potential
- 4. potential
- 5. light sound thermal
- 6. potential
- 7. increase.
- 8. decrease.
- 1. Because the bird is found at a height from the Earth's surface, so it has potential energy.

- Because its height from the Earth's surface increases.
- The potential energy of the apple changes into kinetic energy.
  - The potential energy of the book will increase.
- 1. potential kinetic
  - 2. potential
- 10 1. c 2. a
- 11 1. a 2. b

# Exercises on Lesson 3

- 1 1. d 2. c 3. d 4. d 5. c 6. b 7. c 8. c
  - 9. a 10. b 11. c
- 2 1. b 2. f 3. d 4. a 5. c
- 3 1. (x) 2. (√) 3. (√) 4. (x) 5. (x) 6. (x) 7. (√) 8. (√)
  - 9. (1)
  - Chemical energy.
  - 2. Light energy.
  - 3. Thermal kinetic energy.
  - 4. Gravitational potential energy.
- 5 1. kinetic
  - 2. thermal kinetic
  - 3. decreases.
- 4. sound
- 5. potential
- 6. Gas oven

- 6 1. gravitational chemical sound
  - 2. gravitational 3. kinetic
  - 4. light sound
  - 5. sound kinetic
  - 6. electrical sound
  - 7. light thermal
  - 8. chemical thermal
  - 9. potential kinetic
  - 10. sound thermal
  - 11. light kinetic
  - 12. electrical sound light
- 1. Because it produces light and thermal energies.
  - Because the potential energy which is stored in the spring changes into kinetic energy.
- The electrical energy changes into kinetic and sound energies.
  - The potential energy changes into kinetic energy.
  - The electrical energy changes into light and thermal energies.
- Chemical energy (all items are forms of kinetic energy, while chemical energy is a form of potential energy).
  - Light energy (all items are forms of energy, that can't be seen, while light energy is a form of energy that can be seen).
- 10 1. a 2. a 3. d

# Exercises on Lesson 4

- 1 1.d 2.d 3.b 4.d 5.1
- 2 1.c 2.a 3.d 4.b 5.e
- 3 1. (\(\sigma\) 2. (\(\sigma\) 3. (\(\sigma\) 4. (\(\pi\) 5. (\(\pi\)) 6. (\(\sigma\)) 7. (\(\pi\))
- 4 1. energy 2. potential 3. kinetic 4. chemical
- 5 1. Gasoline.
  - 2. Chemical potential energy.
  - 3. Potential energy.
  - 4. Kinetic energy.
- The stored chemical energy of food changes into kinetic energy so human can carry out different activities.
  - The stored chemical energy in the battery changes into light and thermal energies.
- 7 1. Food.
- 2. Gas oven.
- Flashlight.
- 4. Electric fan.
- 8 1. chemical
- 2. Electrical
- 3. Sound

# Model Exam (1) on Concept (2.2)

- (A) 1. d 2. c 3. d 4. b
  - (B) Because each of them produces light and thermal energies.
- 2 (A) 1. (x) 2. (√) 3. (x) 4. (√)

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- (B) Its potential energy changes into kinetic energy.
- (A) 1. kinetic 2. Thermal 3. potential 4. chemical
  - (B) 1. chemical 2. changes into
    - 3. Kinetic 4. Transferred

### Model Exam (2) on Concept (2.2)

- (A) 1. Kinetic energy.
  - 2. Electrical energy.
  - 3. Potential energy.
  - 4. Chemical potential energy.
  - (B) Chemical energy. (all items are forms of kinetic energy, while chemical energy is a form of potential energy).
- 2 (A) 1. b 2.d 3.b
  - (B) The electrical energy changes into light and thermal energies.
- 3 (A) 1. (x) 2. (x) 3. (x) 4. (\sqrt{)}
  - (B) Because the bird is found at a height from the Earth's surface, so it has potential energy.

# Concept (2.3)

# Exercises on Lesson 1

6. d 7. c 8. a 10. d

- 2. c 3. d
- 3 1. (x) 2. (\sqrt) 3. (x) 4. (\sqrt) 5. (1)
- 1. Wrecking ball. 2. Seatbelt. 4. Vents 3. Airbag.
- 5 1. kinetic
  - 2. Wrecking ball
  - 3. car 5. Airbags
- 4. changes.
- 6. thin nylon
- 7. kinetic
- 6 1. kinetic
  - 2. seatbelts airbags.
  - 3. change.
- 4. airbag
- 5. energy
- 6. energy
- 7. seatbelt
- Because the seatbelts are used in cars to keep the driver's body and also the passengers from moving forward when the car stops suddenly.
  - 2. Because the airbags slow the speed of the driver moving forward and they absorb the energy of the passengers during collision.
  - 3. Because the kinetic energy of the bat transfers to the ball.
- The kinetic energy of the bat transfers to the ball.
  - 2. The energy of collision will push the driver forward strongly that causes many harms to him.

- 2. c 3. d
- 10 1. The car is damaged more than the train. Because the car is slower and lighter than the train and the car has less energy.
  - 2. Airbags inflate automatically.

# Exercises on Lesson 2

- 2. c 5. a 6. b 7. c 10. c
- 2 1. (v) 2. (v) 3. (v) 4. (x) 6. (\(\sigma\) 7. (\(\sigma\) 8. (\(\max\)) 9. (x)
- 3 1. Speed. 2. Kilometer per hour or meter per second.
- 1. decreases 2. increases. 3. large
- 5 1. kinetic 2. more
  - 3. faster
  - 4. meters hours seconds.
  - 5.20
- 6. decrease.
- 7. decrease.
- 6 Because the truck has mass more than that of the small car, so the truck has speed and kinetic energy more than that of the small car.

- 7 1. The kinetic energy of the car increases
  - 2. The speed of the toy car will increase.
- The rabbit has the greatest kinetic energy. Because the speed of rabbit is more than that of tortoise
  - 2. decrease
- 9 Speed = Distance  $=\frac{400}{80}=5$  m/sec.
- 10 Speed = Distance Time  $=\frac{200}{2}$  = 100 km/hr.
- 11 1. Ramp (A). Because the speed of the truck increases by increasing the angle of inclination.
  - 2. The speed of truck will increase.
- 12 Speed of cheetah =  $\frac{\text{Distance}}{\text{Time}} = \frac{240}{2} = 120 \text{ km/hr}.$ 
  - Speed of Deer =

$$\frac{\text{Distance}}{\text{Time}} = \frac{210}{3} = 70 \text{ km/hr}.$$

The speed of cheetah is greater than that of deer so, cheetah can attack the deer.

### Exercises on Lesson 3

8. c 9. b

- 21.c 2e 3.a 4.d
- 3 1 (x) 2 (x) 3 (x) 4 (\sqrt{)} 5 (x) 6 (\sqrt{)} 7 (x) 8 (x) 9 (x)
- 1. Collision.
   2. Sound energy.
- 1. increase.
   2. kinetic
  - 3. big
  - 4. decreases
  - 5. potential
- 6 1. mass speed.
  - 2. energy
  - 3. light sound.
  - 4. collision.
  - 5. kinetic sound.
- Because a part of kinetic energy changes into sound energy.
  - Because if the car increases its speed, its kinetic energy increases that results in exerting a large force during an accident.
- 8 The damage of the two bicycles would be much more severe.
- 9 1.c 2.b 3.a
- 10 1.1 2.c 3.D

# Exercises on Lesson 4

- 1 1. c 2. a 3. c 4. a 5. c 6. a 7. d 8. b 9. b 10. c 11. b 12. d
- 2 1.a 2.d 3.b
- 3 1. (x) 2. (x) 3. (√) 4. (x) 5. (√) 6. (x) 7. (√) 8. (√)
- 4 1. larger 2. kinetic 3. more 4. decreases 5. decreases 6. equal to
- 5 1. speed kinetic 2. less
  - 3. chemical kinetic
  - 4. kinetic
  - 5. kinetic sound
  - 6. kinetic thermal friction
  - 7. friction kinetic
  - 8. potential kinetic
  - 9. kinetic stop.
- 1. Because the truck has more mass than the car.
  - Because the car has a smaller mass than the bus, so it needs a smaller engine to be operated.
  - Because some of the kinetic energy changes into sound energy during collision.
  - Because the energy is conserved during the collision, so it cannot be destroyed.

- 7 1. Its kinetic energy will decrease.
  - The damage would be much more severe.
  - The kinetic energy of the truck is more than that of the small car.
  - It stores potential energy and doesn't have any kinetic energy.
  - The potential energy changes into kinetic energy.
  - Some of kinetic energy changes into thermal energy.
- 8 (3) Kinetic energy is transferred from the first ball .......
  - (2) Potential energy of the first ball decreases ......
  - (4) Kinetic energy of all balls decreases ......
  - (1) Raise up the first ball, ......
- 9 1. c 2. b 3. a
- 10 1. c 2. b

# Model Exam (1) on Concept (2.3)

- (A) 1. d 2. c 3. a 4. c
  (B) Because the kinetic energy of the bat transfers to the ball
- 2 (A) 1. (✓) 2. (**x**) 3. (✓) 4. (✓)
  - (B) The damage of the two bicycles would be much more severe.

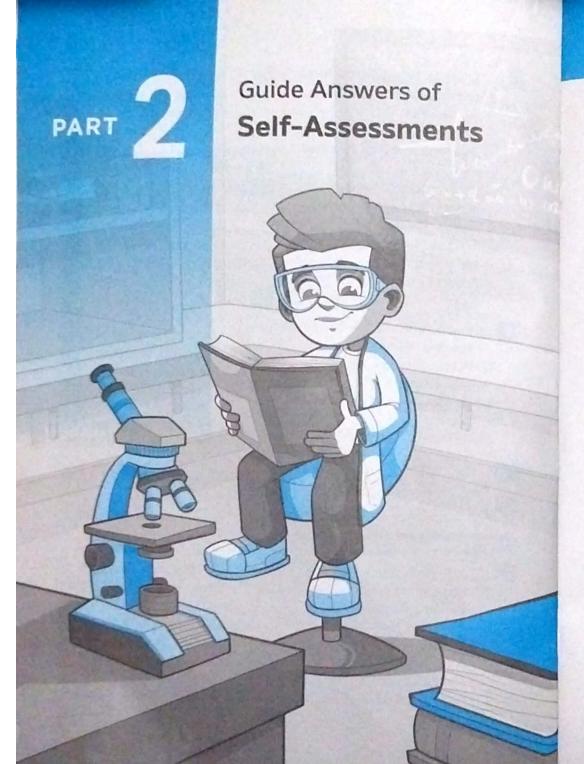
- 3 (A) 1. kinetic
  2. height 3. equal to
  4. increases.
  - (B) 1. b 2. d 3. c

# Model Exam (2) on Concept (2.3)

- (A) 1. Wrecking ball.
  - 2. Collision.
  - 3. Vents.
  - 4. Sound energy.
  - (B) 1. b
- 2 (A) 1. (x) 2. (\sqrt) 3. (\sqrt) 4. (\sqrt)
  - (B) (2) Potential energy of the first ball decreases ......

2. d

- (3) Kinetic energy is transferred from the first ball ......
- (1) Rise up the first ball, ......
- (4) Kinetic energy of all balls decreases ......
- (A) 1. kinetic sound 2. 20 3. decrease
  - 4. airbag
  - (B) Because the vehicle with the large mass has more kinetic energy than that of the vehicle with the small mass, so it causes more damage.



# Concept (1.1)

# Self-Assessment 1

- 1 (A) 1. b 2. b 3. a
  - (B) To hide among the colorful rocks from their predators or preys.
- (A) 1. (x) 2. (√) 3. (x)
   (B) They can't hide and hunt its preys in the forest environment.
- 3 1. Figure (b).
  - The blood moving up into the penguin's body will be cold which may make it freeze.

### Self-Assessment 2

- 1 (A) 1. structural behavioral 2. behavioral – structural 3. acacia – kapok
  - (B) It cannot sneak up on its prey by countershading camouflage.
- 2 (A) 1. prey.
  - salt water and fresh water.
     sunlight.
  - (B) To prevent the plant from the loss of water.
- 1. Starred agama lizard and fennec fox.

- Palm tree and barbary fig plant.
- 3. 1. (1) 2. (1)

# Self-Assessment 3

- (A) 1. d 2. a 3. d (B) Because it moistens food and
- begins to break it down.
- 2 (A) 1. (×) 2. (✓) 3. (×)
  - (B) Nutrients will not be absorbed and will not be carried to all the body parts.
- 3 1. trachea. 2. esophagus.
  - lungs.stomach.
  - 5. respiratory digestive

### Self-Assessment 4

- 1 (A) 1. c 2. c 3. b
  - (B) Because humans breathe in air, and need clean water to drink, while fish need clean water to breathe.
- 2 (A) 1. (x) 2. (x) 3. (√)
  - (B) 1. Animal → Starred agama lizard
    - · Plant → Barbary fig
    - Animal → Panther chameleon
      - · Plant -> Kapok tree
    - 3. Animal --> Penguin
      - · Plant -> Pine tree

- 4. Animal → Bull shark
   Plant → Mangrove tree
- It has a very long trunk, so most animals except giraffe cannot reach its leaves to feed on.
  - They have gills to breathe under water.
  - It has white fur helps it blend in with the snow as it sneaks up on its prey.

# Self-Assessment 5

- (A) 1. Starred agama lizard (all items are amphibians, while starred agama lizard is a reptile).
  - Palm tree (all items live in water environment, while palm tree lives in desert environment).
  - Acacia tree (all items live in rainforests, while acacia tree lives in savannah grassland).
  - (B) Because their numbers were decreased in the last few years.
- 2 (A) 1. Amphibians
  - 2. Skin.
  - 3. Savannah grassland.

- (B) d. Because wet environment is the natural habitat, where amphibians can extract oxygen gas directly from water through skin.
- 3. Habitat (A) 2. Habitat (B) 3. Habitat (A) 4. Habitat (A) 5. Habitat (B) 6. Habitat (B) 7. Habitat (A) 8. Habitat (A)
  - 9. Habitat (A) and habitat (B)
  - 10. Habitat (B)

# Model Exam on Concept (1.1)

- 1 (A) 1. cool 2. expands 3. mild
  - 4. blood vessels
  - (B) Because starred agama lizard belongs to reptiles, while golden frog belongs to amphibians.
- 2 (A) 1. (B) 2. (S) 3. (B) 4. (S)
  - (B) The digestive system could not do its function correctly.
- (B) 1. b 2. c 3. a 4. d (B) 1. Alveoli. 2. Arctic fox.

# Concept (1.2)

# Self-Assessment 6

- 1 (A) 1. echolocation 2. sight – hearing
  - 3. eyes tongue.

- (B) Because they use ecolocation to locate their preys under water.
- 2 (A) 1. (≭) 2. (✓) 3. (✓)
  (B) 1. Sight, smell and taste.
  2. Taste, tongue.
- 3 1. a 2. b 3. d 4. c

# Self-Assessment 7

- 1 (A) 1. c 2. a 3. c
  (B) To connect the sensory organs and the body parts with the brain.
- (A) 1. (✓) 2. (✗) 3. (✗)
  (B) It cannot jump for long distances to run away from its enemies.
- 3 1. nervous 2. fast 3. owl

# Self-Assessment 8

- 1 (A) 1. Brain.
  - 2. Nervous system.
  - Reaction time.
  - (B) The sound waves bounce back to the bat and helps it to locate the insect.
- 2 (A) 1. c 2. a 3. d
  - (B) To help it survive through finding food and protecting itself under water.

- 3 (3) The rabbit's brain processes .....
  - (2) The rabbit's nerves .....
  - (4) The rabbit's brain sent a signal .....
  - (1) The rabbit saw a fox .....

# Self-Assessment 9

- 1 (A) 1. c 2. d 3. b
  - (B) Because owl has bowl-shaped face and feathers in its head.
- 2 (A) 1. feeding 2. smell 3. structural
  - (B) The cane will make vibrations that tell the blind person that there is an object in front of him.
- 3. Owls. 2. Jerboas. 3. Owls. 4. Dolphins.

# Model Exam on Concepts (1.1) & (1.2)

- 1 (A) 1. ( $\checkmark$ ) 2. (x) 3. (x) 4. ( $\checkmark$ )
  - (B) 1. Small intestine (all items belong to the nervous system, while small intestine belongs to the digestive system).
    - Diaphragm (all items belong to the digestive system, while diaphragm belongs to the respiratory system).

- 2 (A) 1. c B 2. a D 3. d - A 4. b - C
  - (B) To alert the scout ants that the food is low.
- 3 (A) 1. reflex. 2. oxygen gas 3. penguin 4. reaction time. (B) 1. gills 2. soldier

# Concept (1.3)

# Self-Assessment 10

(A) 1. (✓)
 (B) To collect more light to give excellent night vision for

hunting.

- (A) 1. c 2. b

  (B) It doesn't have excellent night vision so cannot hunt at night.
- 3 1. d 2. d 3. c 4. d

# Self-Assessment 11

- (A) 1. (✓)
   (B) Because air is a transparent object that allows light to pass through.
- 2 (A) 1. d 2. c 3. a
  (B) 1. Mirror (all items are rough surfaces, while mirror is smooth and shiny surface).

- Glass cup (all items are opaque objects, while glass cup is transparent object).
- 3 1. Yes. 2. b

# Self-Assessment 12

- (A) 1. (★)
   (B) Because they use their wings to form different flash patterns to warn off from predators or to attract a mate to reproduce.
- 2 (A) 1. behavioral 2. humans. 3. sight.
  - (B) By producing a chemical reaction inside their bodies.
- 3 1. d 2. d 3. b 4. c

# Self-Assessment 13

- (A) 1. c 2. c 3. d
  - (B) Because in a completely dark room there is no light to be reflected by the mirror-like membrane.
- 2 (A) 1. (✓) 2. (✓) 3. (✗)

  (B) Fishing cats don't have

(B) Fishing cats don't have excellent night vision so cannot hunt at nights.

# 3

Fishing cats	Firefly beetles
mirror-like     membrane – eyes.     light reflection –	chemical reaction     bodies.      flash patterns –
hunt	communicate

# Model Exam on Theme (1)

- (A) 1. b 2. c 3. a 4. c
   (B) Because they make a chemical reaction inside their bodies, that produces light.
- (A) 1. (x) 2. (√) 3. (x) 4. (x)
   (B) It cannot jump for long distances to run away from its enemies.
- 3 (A) 1. eyes. 2. arctic 3. bats 4. feeding (summer)
  - (B) (1) Esophagus
    - (2) Small intestine
    - (3) Large intestine
    - (4) Trachea

# Assess Your Learning on Theme (1)

- 1 1. b 2. c 3. b 4. d 5. c 6. b 7. d
- 2 1.

The inhaled air	The exhaled air	
Rich in oxygen gas.	Rich in carbon dioxide gas.	

2

Structural adaptation	Behavioral adaptation
It is a change in the	It is a change in the
body structure of a	behaviors or acts of
living organism to	a living organism to
help it survive.	help it survive.

3.

Communication in humans	Communication in animals
Reading Watching TV Cell phone Producing sounds Displaying light Writing	Echolocation     Producing sounds     Displaying light

- 3 1. (x) 2. (\sqrt{)} 3. (\sqrt{)} 4. (x) 5. (\sqrt{)} 6. (\sqrt{)} 7. (x) 8. (x) 9. (\sqrt{)} 10. (x)
- 1. hearing ear brain
   2. digestive system stomach respiratory system.
- Because cats have bigger eyes, wider eye pupils and a mirror-like membrane at the back of their eyes.
  - Because bats depend on echolocation to locate their preys at night.

# Concept (2.1)

# Self-Assessment 14

- 1 (A) 1. (\*) 2. (\sqrt) 3. (\sqrt)
  - (B) Because by increasing the number of fire extinguishers, the speed of the cart will increase.
- 2 (A) 1. b 2. d 3. a
  - (B) The Shockwave truck.
    - Because it has three jet engines that make it faster than the normal truck.
- The Shockwave truck.
   It will move with a slower speed.

# Self-Assessment 15

- 1 (A) 1. d 2. b 3. a
  - (B) The team with greater force will win the game, because the rope will move toward the team of greater pulling force.
- (A) 1. greater
  - 2. greater
  - 3. pushing
  - (B) To help slow down their movement.
- 3 1. a 2. b 3. a

# Self-Assessment 16

- (A) 1. pushing pulling
  - 2. balanced.
  - 3. friction
  - (B) Because car (B) is smaller than car (A), so it travels a distance longer than car (A).
- 2 (A) 1. (x) 2. (\sqrt) 3. (\sqrt)
  - (B) The toy car travels a distance longer than the toy truck.
- 3 (A) 1. (★) 2. (✓) 3. (✓) (B) 1 – 2

# Self-Assessment 17

- 1 (A) 1. a 2. a 3. b
  - (B) Because there is a friction force between the moving body and the ground that acts in the opposite direction of the body movement.
- 2 (A) 1. equal to 2. equal to 3. shorter
  - (B) Due to the effect of pulling force of gravity down toward the Earth.
- 3 (A) 1. (3) and (4)
  - 2. 1 and 2
  - 3. Friction force.
  - (B) 1. (★) 2. (✓) 3. (✓)

# Model Exam on Concept (2.1)

- 1 (A) 1. b 2. c 3. b 4. d
  - (B) The Shockwave truck starts to stop gradually.
- 2 (A) 1. (\*) 2. ( $\checkmark$ ) 3. ( $\checkmark$ ) 4. (x)
  - (B) Due to the help of powerful three jet engines.
- 3 (A) 1. energy 2. longer 3. pulling – pulling 4. fixed
  - (B) Car (A), because it travels a longer distance than car (B).

# Concept (2.2)

# Self-Assessment 18

- 1 (A) 1. c 2. d 3. b
  - (B) The stored potential energy in the train is changed into kinetic energy.
- 2 (A) 1. (\*) 2. (\sqrt) 3. (\sqrt)
  - (B) Because his stored potential energy changes into kinetic energy.
- 31.1-2
  - 2. 2 3
  - 3. kinetic increase

# Self-Assessment 19

- 1 (A) 1. d 2. c 3. d
  (B) Because its height from the
  Earth's surface will increase.
- (A) 1. (★) 2. (✓) 3. (✓)

  (B) Its potential energy changes into kinetic energy.
- 3 1. c 2. a

# Self-Assessment 20

- 1 (A) 1. c 2. c 3. b
  - (B) Because the battery stores chemical potential energy, while a ball at the top of hill stores gravitational potential energy.
- 2 (A) 1. (x) 2. (x) 3. (x)
  - (B) Its kinetic energy changes into potential energy.
- 3 1. a 2. c 3. a

# Self-Assessment 21

- 1 1. b 2. c 3. c
- 2 (A) 1. (V) 2. (X)
  - (B) 1. b 2. c 3. d 4. a
- 3 1. c 2. a 3. b

# Model Exam on Concepts (2.1) & (2.2)

- (A) 1 a 2 c 3.b 4.d
  - (B) His potential energy changes into kinetic energy.
- 2 (A) 1. (\*) 2. (\*) 3. (\sqrt) 4. (\sqrt)
  - (B) Because burning of food produces kinetic energy to carry out different activities.
- (A) 1. potential 2. work 3. gravity. 4. long
  - (B) 1. The Shockwave truck.2. It cannot stop easily.

# Concept (2.3)

# Self-Assessment 22

- 1 (A) 1. d 2. c 3. d
  - (B) To allow the driver to get out of the car.
- 2 (A) 1. (✓) 2. (✓) 3. (×)
  - (B) The airbags will inflate and fill with a gas.
- 3 ..... kinetic ...... different ...... car.

# Self-Assessment 23

(A) 1. b 2. d 3. a (B) Speed =  $\frac{\text{Distance}}{\text{Time}}$ =  $\frac{240}{\text{A}}$  = 60 km/hr.

- 2 (A) 1. (x) 2. (x) 3. (\sqrt{)
  - (B) Its kinetic energy will increase.
- 3 1.b 2.d 3.a

### Self-Assessment 24

- (A) 1. d 2. a 3. c (B) Its kinetic energy will increase.
- 2 (A) 1. (x) 2. (√) 3. (√)
  - (B) Because the speed of the object that moves down a ramp increases by increasing the angle of the ramp.
- 3 1. c 2. b 3. c 4. b

# Self-Assessment 25

- 1 (A) 1. c 2. c 3. d
  - (B) Because some of kinetic energy of balls changes into sound energy.
- 2 (A) 1. (★) 2. (★) 3. (✔)
  - (B) Their kinetic energy will decrease gradually until they stop.
- 3 1.b 2.a 3.c

### Model Exam on Theme (2)

- 1 (A) 1. c 2. b 3. d 4. c
  - (B) Due to the help of three jet engines.

- 2 (A) 1. (\*) 2. (\*) 3. (\$\sqrt{}\$) 4. (\$\sqrt{}\$)
  - (B) The energy of collision will push the driver forward strongly that causes many harms to him.
- (A) 1. Pushing force.
  - 2. Kinetic energy,
  - 3. Speed. 4. Seatbelts.
  - (B) Chemical energy (all items are forms of kinetic energy except chemical energy which is a form of potential energy).

### Assess Your Learning on Theme (2)

- 1 1. c 2. d 3. b 4. b 5. a 6. c 7. a 8. c
- 2 1. a. Unbalanced. b. Left.
  - 2. Car (B) has the higher speed  $(- speed of car (A) = \frac{100}{20}$ = 5 m/sec.
    - speed of car (B) =  $\frac{300}{20}$ = 15 m/sec.
  - 3. potential kinetic
- 3 1.b 2.c 3.e 4.a

# Model Answer October Tests

# Model 1

- 1 (A) 1. b 2. c 3. b 4. a
  - (B) Because it is change in the behaviors or acts of fennec fox to help it survive.
- 2 (A) 1. (x) 2. (x) 3. (x) 4. (√) (B)

	In summer	In winter
Produced sound:		High-pitched
oound.	sounds	sounds

- 3 (A) 1. Brain. 2. Trachea. 3. Pine tree.
  - 4. Countershading.
  - (B) They crush (grind) food during chewing.

# Model 2

- (A) 1. exhalation inhalation
  - 2. hearing echolocation
  - 3. small intestine large intestine.
  - 4. skin lungs.
  - (B) The brain will process this message and send the suitable respond to the body through nerves.

- 2 (A) 1. buttress roots
  - 2. Reaction time
  - 3. brown
  - 4. backbone.
  - (B) To scare its enemies during danger.
- 3 (A) 1. It pants like dogs to cool its body.
  - It has long hind legs to jump a long distance.
  - 3. Barbary fig.
  - 4. Owl.
  - (B) Bat (all other living organisms produce smelly messages, except bat).

# Model Answer November Tests

### Model

- 1 (A) 1. d 2. b
- 3. a

4. d

- (B) Because it doesn't allow light to pass through it.
- 2 (A) 1. (¥) 2. (¥) 3. (√) 4. (¥)
  - (B) Its speed decreases gradually until it stops.
- 3 (A) 1. Light. 2. Friction. 3. Code. 4. Gravity.

- (B) (3) The light rays bounce off the object ......
  - (1) The electric lamp emits ......
  - (2) The light rays fall on object ......

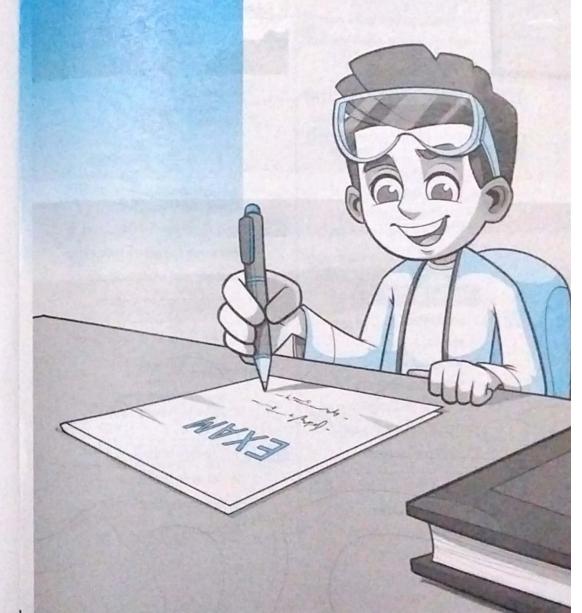
### Model

2

- (A) 1. transparent opaque
  - 2. pushing pulling
  - 3. diffuse different
  - 4. chemical light
  - (B) The light rays will reflect in one direction with the same angle which they strike the object.
- 2 (A) 1. narrower
  - 2. The Sun
  - 3. unbalanced
  - 4. friction
  - (B) The Shockwave truck starts to stop gradually.
- 3 (A) 1. (✓) 2. (✓) 3. (✓) 4. (×)
  - (B) Due to the pushing force of your leg that acts on it.

# PART 3

# Guide Answers of Final Examinations



# El-Moasser Final Examination Models

# Model Exam 1

- 1 (A) 1. b 2. c 3. d 4. c
  - (B) Because they prevent the driver and passengers from moving forward when the car suddenly stops.
- 2 (A) 1. (x) 2. (\sqrt) 3. (\sqrt) 4. (x)
  - (B) The kinetic energy will increase
- 3 (A) 1. Trunk. 2. Nerves.
  - 3. Friction force.
  - 4. Hour or second.

(B) Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{300}{30}$  = 10 m/sec.

# Model Exam 2

- 1 (A) 1. parachutes
  - 2. kinetic
  - 3. electrical sound
  - 4. light sound
  - (B) Due to the pushing force of his hand against the ball that stops it.
- 2 (A) 1, cars
  - 2. thermal energy.
  - 3. sharp
- 4. tires

(B)

Opaque objects	Transparent objects	
• Wood.	· Air. · Water.	
Metal.	· Lenses.	

- (A) 1. Nurse ants. 2. Gravity.
  - 3. Needle leaves.
  - 4. Nose.

(B) Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{160}{2}$  = 80 km/hr.

# Model Exam 3

- 1 (A) 1. c 2. a 3. b 4. b
  - (B) Because the mirror has more smooth and shiny surface than the painted surface.
- 2 (A) 1. (\*) 2. (\sqrt) 3. (\sqrt) 4. (\sqrt)

(B) Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{240}{3}$  = 80 km/hr.

- (A) 1. Sensory organs
  - 2. Vents or holes.
  - 3. Rough surface.
  - 4. Diaphragm.

(B)

Organisms live in deserts	Organisms live in forests
<ul> <li>Starred agama lizard.</li> <li>Fennec fox.</li> <li>Palm tree.</li> <li>Barbary fig plant.</li> </ul>	<ul><li>Panther chameleon.</li><li>Kapok tree.</li></ul>

# Model Exam 4

- (A) 1. Camouflage.
  - 2. Nervous system.
  - 3. Electrical energy.
  - 4. Work.
  - (B) The Sun.
- (A) 1. c 2. a 3. d 4. d (B) The ecosystems is still clean without pollution.
- 3 (A) 1. unbalanced
  - 2. sound
  - 3. Kinetic energy
  - 4. nervous system.

(B) Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{200}{5}$  = 40 m/sec.

# Model Exam 5

- (A) 1. b 2. a 3. b 4. d
   (B) It cannot reach to water in dry season, and cannot survive.
- 2 (A) 1. (✓) 2. (✗) 3. (✓) 4. (✓) (B) 1. Balanced. 2. Unbalanced.

- 3 (A) 1. Fennec foxes.
  - Gravity.
     Airbag.
     Mangrove tree.
  - (B) To prevent animals from reaching its leaves to feed on.

# Model Exam 6

- 1 (A) 1. b 2. d 3. b 4. a
  - (B) Because camouflage helps some animals hide from their predators or preys in different environments.
- 2 (A) 1. (x) 2. (x) 3. (x) 4. (\sqrt)
  - (B) Animals have super sight sense : Owl – Fishing cat.
    - Animals have super hearing sense: Bat – Dolphin – Owl.
- 3 (A) 1. Small intestine.
  - 2. Countershading.
  - 3. Energy. 4. Tongue.

(B) Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{150}{5}$  = 30 m/sec.

# Model Exam 7

- 1 (A) 1. b 2. d 3. d 4. d
  - (B) Some of kinetic energy is changed into thermal energy.
- 2 (A) 1. (V) 2. (X) 3. (V) 4. (X)

(B) Speed = 
$$\frac{\text{Distance}}{\text{Time}} = \frac{250}{5}$$
  
= 50 m/sec.

- 3 (A) 1. Respiration process.
  - 2. Panther chameleon.
  - 3. Kinetic energy.
  - 4. Chemical potential energy.
  - (B) Because polluted air causes harm to the respiratory system.

# Model Exam 8

- 1 (A) 1. (x) 2. (\sqrt) 3. (\sqrt) 4. (x)
  - (B) Because the speed is equal to distance over time (Speed = Distance).
- 2 (A) 1. b 2. b 3. c 4. b
  - (B) Speed =  $\frac{\text{Distance}}{\text{Time}}$ =  $\frac{220}{3}$  = 110 km/hr.
- 3 (A) 1. increases. 2. Water 3. stronger 4. different
  - (B) The nurse ants send smelly messages to scout ants that alert them to find the food.

# Model Exam 9

- 1 (A) 1. eyes brain.
  - 2 (B) (A)
  - 3. lungs gills
  - 4. airbags seatbelts.
  - (B) Due to the difference in the forces that act on them.

- 2 (A) 1. (x) 2. (\sqrt) 3. (\sqrt) 4. (x)
  - (B) Speed =  $\frac{\text{Distance}}{\text{Time}}$ =  $\frac{400}{20}$  = 20 m/sec.
- 3 (A) 1. d 2. d 3. c 4. c
  - (B) Types of The used communication senses 1. Watching TV. Sight and hearing. 2. Flashing lights Sight. of fireflies. 3. Echolocation Hearing. in dolphins. 4. Using the cell Sight and phone. hearing.

# Model Exam 10

- 1 (A) 1. c 2. a 3. d 4. c
  - (B) Because it transfers messages between the brain and body parts and vice versa.
- 2 (A) 1. energy 2. bats 3. kinetic 4. kinetic

(B) Speed = 
$$\frac{\text{Distance}}{\text{Time}}$$
  
=  $\frac{100}{2}$  = 50 km/hr.

3 (A) 1. (✓) 2. (✓) 3. (×) 4. (✓) (B) 1. (1), (3) 2. (4) 3. (2)

# Final Examinations of Some Governorates

### Calro Governorate

- 1 Heliopolis Educational Zone
- 1 (A) 1. light 2. contracts 4. forward.
  - (B) 1. The main control center in the body.
    - They carry messages from the brain to the spinal cord and other parts of the body and vice versa.
- 2 (A) 1. (X) 2. (X) 3. (X) 4. (X)
  - (B) Speed of car (A)

$$= \frac{\text{Distance}}{\text{Time}} = \frac{300}{10} = 30 \text{ m/sec.}$$

Speed of car (B)

$$= \frac{\text{Distance}}{\text{Time}} = \frac{100}{10} = 10 \text{ m/sec.}$$

So, car (A) is faster than car (B).

- 3 (A) 1. c 2. b 3. a 4. d
  - (B) Trachea (all items are organs of digestive system except trachea is an organ of respiratory system).

### 2 Maadi Educational Zone

- 1 (A) 1. c 2. a 3. b 4.
  - (B) To communicate with each other in different seasons.
- 2 (A) 1. ( $\checkmark$ ) 2. (x) 3. (x) 4. ( $\checkmark$ )
  - (B) The brain.

- (A) 1. gills 2. Bat 3. increases. 4. faster
  - (B) Figure (a), because the light rays are reflected in one direction with the same angle at which they strike the object.

# 3 El-Nozha Educational Zone

- 1 (A) 1. c 2. d 3. d 4. d
  - (B) Because camouflage helps some animals hide from their predators or preys in different environments.
- 2 (A) 1. (x) 2. (x) 3. (√) 4. (x)
  - (B) It produces a chemical reaction inside its body to light up and attract a mate.
- 3 (A) 1. b 2. d 3. a 4. c (B)

Point of comparison	Fennec fox	Arctic fox
Shape of ears	Extra-large	Small

# 4 Helwan Educational Zone

- 1 (A) 1. energy. 2. Brain 3. Acacia tree 4. increases.
  - (B) Because they depend on echolocation to find their preys at night.

- (A) 1. c 2. a 3. b 4. b
  - (B) The soldier ants send smelly messages to alert the other ants that there is a danger nearby.
- (A) 1. c 2. d 3. a 4. b (B) The fishing cat.

### Giza Governorate

# 5 Awseem Educational Zone

- (A) 1. c 2. c 3. d 4. b (B) The nose.
- 2 (A) 1. (X) 2. (X) 3. (\sqrt{)} 4. (X)
  - (B) Structural adaptation.
- 3 (A) 1. pulling 2. brain 3. kinetic 4. all directions (B) Ant.

# 6 Agoza Educational Zone

- 1 (A) 1. b 2. c 3. b 4. c
  - (B) Stomach (all items belong to respiratory system, while stomach belongs to digestive system).
- 2 (A) 1. (★) 2. (★) 3. (✔) 4. (★)
  - (B) Because they depend on echolocation to find their preys at night.
- 3 (A) 1. Eye 2. Wood 3. gills 4. Mangrove (B) Brain

### Alexandria Governorate

# 7 Al Montaza Educational Zone

- 1 (A) 1. (x) 2. (\sqrt{)} 3. (x) 4. (\sqrt{)}
  - (B) Bull shark (all items live on land, while bull shark lives in water).
- 2 (A) 1. bats. 2. straight 3. nose 4. gills (B) Arctic fox.
- 3 (A) 1. d 2. a 3. c 4. c
  - (B) Because camouflage helps some animals hide from their predators or preys in different environments.

# 8 | Borg Al-Arab Educational Zone

- 1 (A) 1. d 2. a 3. b 4. d
  - (B) To prevent animals from eating these leaves.
- 2 (A) 1. ( $\checkmark$ ) 2. (x) 3. ( $\checkmark$ ) 4. ( $\checkmark$ )
  - (B) The nurse ants send smelly messages to scout ants to alert them to find food.
- (A) 1. Amphibians. 2. Chemical energy.
  - 3. Reaction time.
  - 4. Friction.

(B)

Opaque objects	Transparent objects	
Wood	Air	
Metal	Water	

### El-Menoufla Governorate

# 9 Tala Educational Zone

- (A) 1. Chameleon (all items live in desert habitat, while chameleon lives in rainforest habitat).
  - Acacia tree (all items live in polar habitat, while acacia tree lives in savannah habitat).
  - Light energy (all items are forms of energy that can't be seen, while light energy is a form of energy that can be seen).
  - Stomach (all items belong to respiratory system, while stomach belongs to digestive system).
  - (B) Structural adaptation.
- (A) 1. Seatbelt. 2. Light energy.3. Pushing force.4. Pine tree.
  - (B) Speed =  $\frac{\text{Distance}}{\text{Time}} = \frac{220}{2}$ = 110 Km/h.
- 3 (A) 1. (★) 2. (✓) 3. (✓) 4. (★)
  - (B) The size of chest increases, the air rich in oxygen enters the lungs.

### Dakahlia Governorate

# 10 Dakahlia Edu. Zone

1 (A) 1. d 2. c 3. c 4. a

- (B) Blood vessels → Alveoli
   → Two bronchi → Trachea
   → Nose.
- 2 (A) 1. ( $\checkmark$ ) 2. ( $\checkmark$ ) 3. ( $\checkmark$ ) 4. ( $\checkmark$ )
  - (B) It cannot see clearly and hunt at night.
- (A) 1. small intestine. 2. nervous 3. 10 4. pushing
  - (B) Because opaque objects don't allow light to pass through.

### Suez Governorate

# 11 Science Inspectorate

- (A) 1. b 2. a 3. c 4.
  - (B) Because the inhaled air is rich in oxygen gas, while the exhaled air is rich in carbon dioxide gas.
- 2 (A) 1. (x) 2. (x) 3. (x) 4. (\sqrt{)}
  - (B) The nurse ants send smelly messages to scout ants to alert them to find the food.
- (A) 1. increases. 2. dolphins. 3. decreases
  - 4. Humpback whale
  - (B) Air is a transparent material.- Rock is an opaque material.

### Damietta Governorate

# 12 Damietta Edu. Zone

1 (A) 1. d 2. d 3. b 4. c

# PART 3

- (B) To keep its body warm in extreme cold climate.
- 2 (A) 1. (V) 2. (V) 3. (X) 4. (V)
  - (B) structural adaptation.
- 3 (A) 1. e 2. a 3. d 4. b
  - (B) Lungs (all items belong to nervous system, while lungs belong to respiratory system).

# El-Behira Governorate

- 13 Kafr El-Dawar Edu. Zone
- 1 (A) 1. sandy 2. 500 3. bodies 4. countershading.
  - (B) potential kinetic
- (A) 1. Buttress roots. 2. Gravity force.
  - 3. Light energy.
  - 4. Alveoli.
  - (B) Seatbelts.
- 3 (A) 1. a 2. a 3. c 4. a
  - (B) Speed of car (a)

$$= \frac{\text{Distance}}{\text{Time}} = \frac{100}{20} = 5 \text{ m/sec.}$$

- Speed of car (b)

$$= \frac{\text{Distance}}{\text{Time}} = \frac{300}{20} = 15 \text{ m/sec.}$$

So, car (b) moves faster than car (a).

# Beni-Suef Governorate

- 14 Science Inspectorate
- 1 (A) 1. b 2. d 3. d 4. d

- (B) 1. Nervous system.
  2. Nurse ants.
- 2 (A) 1. (★) 2. (★) 3. (✔) 4. (★)
  - (B) 1. Anus (all items belong to respiratory system, while Anus belongs to digestive system).
    - Fennec fox (all items live in polar region, while fennec fox lives in desert region).
- 3 (A) 1. kinetic
  - penguin polar bear.
  - light countershading
  - 4. lungs
  - (B) 1. B 2. A

# South Sinai Governorate

- 15 Science Inspectorate
- 1 (A) 1. c 2. b 3. b 4. c
  - (B) Because cats have mirror-like membrane at the back of their eyes while human doesn't have mirror-like membrane so human cannot see in dark.
- 2 (A) 1. (★) 2. (✓) 3. (✓) 4. (★)
  - (B) During inhalation, the diaphragm contracts and moves downward while during exhalation process, it relaxes and moves upward.
- 3 (A) 1, c 2, d 3, a 4, b
  - (B) Because bats depend on echolocation to hunt their preys at night.